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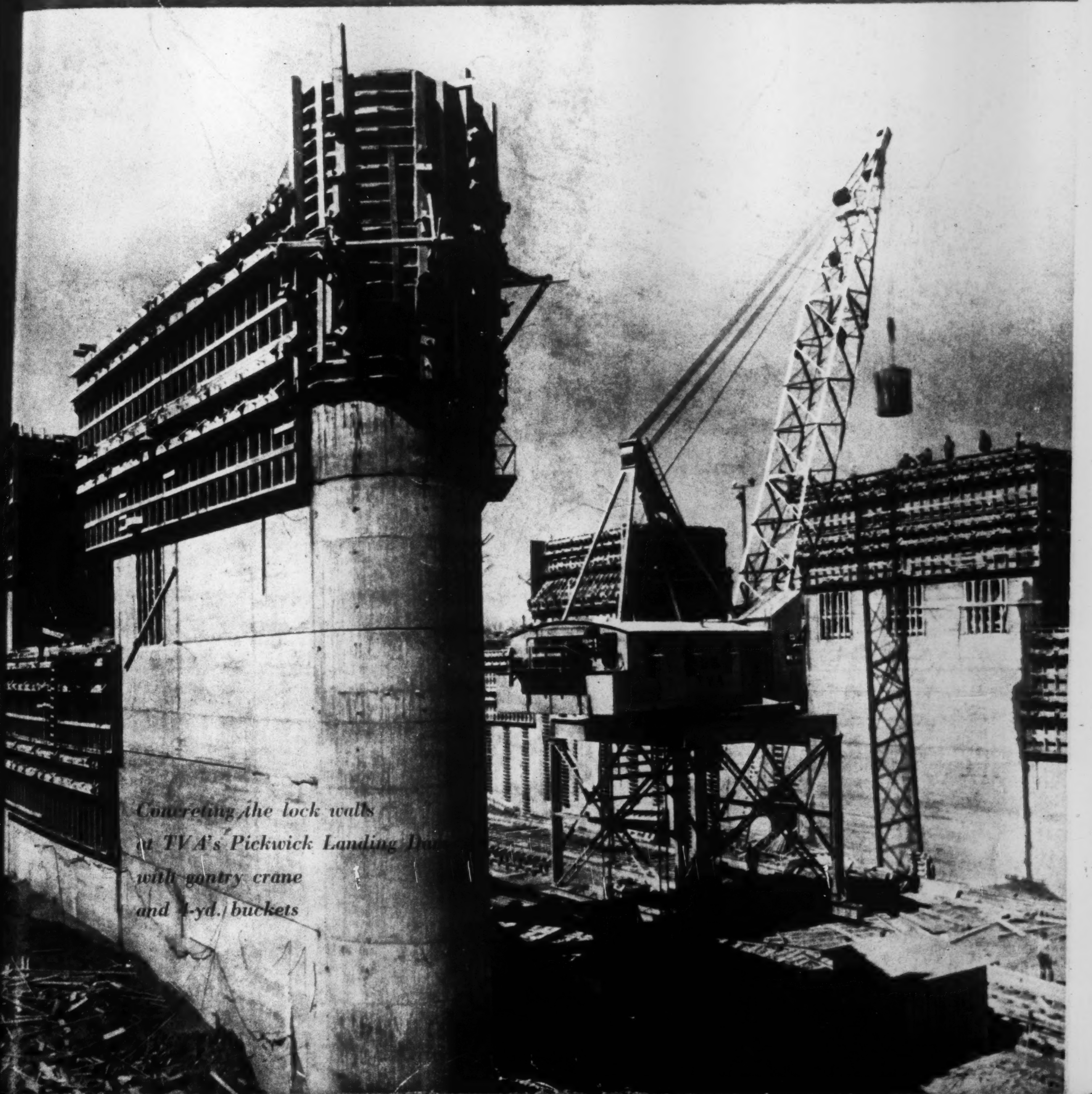

Concreting the lock walls at TVA's Pickwick Landing Dam with gantry crane and 4-yd. buckets

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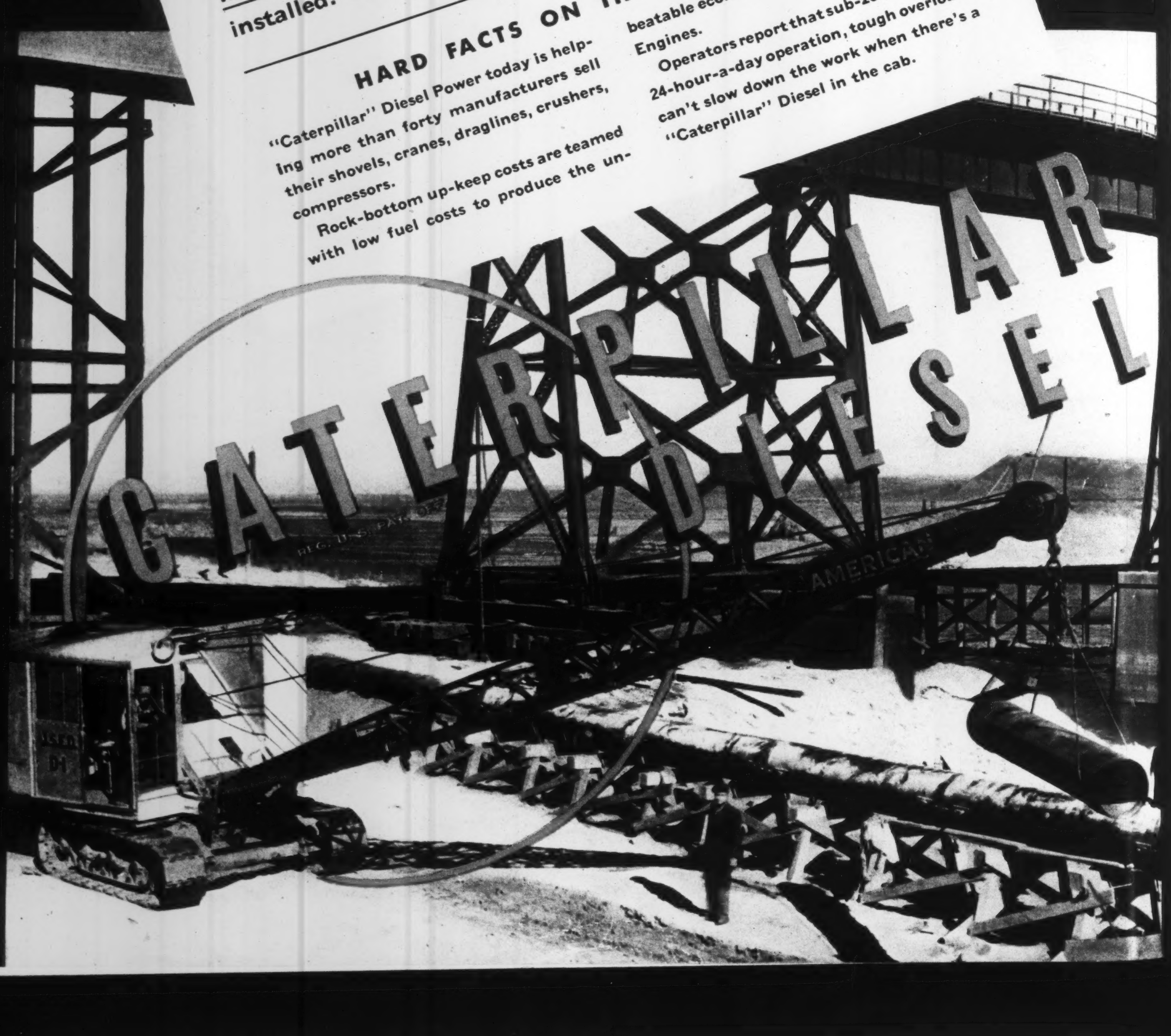

A MOMENT WITH THE PUBLISHERS

To Make Principles EFFECTIVE

THE Construction League statement of the policies that should govern work-relief and public construction chimes opportunely with the introduction of a resolution in Congress to provide $700,000,000 for the use of PWA. Only by providing somehow for the maintenance of PWA can the federal government observe the principles advocated by the League.

These specify that no federal work-relief program should encroach on the field of public construction normally carried on by private enterprise. They urge also that federal aid to non-federal public works be not abruptly curtailed at this time without providing for a gradual transition to more normal conditions.

Both these specifications imply a continuance of the PWA effort, which, however, appears not to have the blessing of the President. His recent message requested $1,500,000,000 for work-relief purposes. Although no bill yet has been introduced, the chances are that these funds would be disbursed through WPA and CCC. Unless a specific appropriation, or some part of the $1,500,000,000 be allocated to PWA, no provision will have been made for its continuance.

WHATEVER impatience many constructors may have felt with PWA and its peppery administrator, the fact remains that it has stimulated most of the public works construction that has meant anything to the construction industry and those dependent on it. While the trend of WPA administration has been toward the socialization of public construction at the expense of legitimate construction workers, PWA has handled a large volume of useful work by normal methods and through normal channels. It has been a real help in a troublous time.

Especially has this been true of non-federal public works. Here the stimulus rendered by PWA to many communities has multiplied substantially the practical effect of the federal expenditures. Of the $4,880,000,000 voted by the last Congress, PWA got less than $340,000,000. But with this sum, supplemented by the local appropriations it stimulated, it was able to do more than $650,000,000 worth of work. Although its progress was sadly delayed by the initial floundering of WPA, 90 per cent of its volume was under contract by December and today initial contracts have been let on 98 per cent of it. Taking into account funds that were carried over from previous years, the work now in hand is about $780,000,000, which probably will reach its peak in June.

The crowning irony of the PWA situation is that now, with its organization well established and functioning, with more effective cooperation between constructors and the administrators, with approved applications on hand for $2 billions of additional work, and with $1.5 billions of this all set, with plans, specifications and legal formalities well in hand, PWA now may be permitted to languish for lack of an appropriation. And this despite the fact that $700,000,000 out of the funds requested by the President for work-relief would swing into action the entire $1.5 billion that is ready. Bear in mind that this represents useful and needed facilities toward which local communities are willing to pay 55 per cent of the cost; it is not "made work" cooked up simply to make jobs. Bear in mind also that the bulk of such work will be done by contract thereby creating real jobs in private employment for the worthy and competent employees of those industries that are dependent on construction activity. The President says that the federal government should be relieved of the unemployment burden. He would do well to consider what PWA has done to that end by stimulating local communities to carry on useful works and by fostering the employment through private enterprise of many who otherwise would have gone on relief. With these millions still dependent on PWA employment, it is no time for him to abandon that effort.

THE resolution that has been introduced into Congress provides $700,000,000 for PWA. If the construction industry would realize the objectives defined by the Construction League, if it would safeguard itself from socialization so far as public construction is concerned and if it would support itself and its employees until such time as private construction has resumed more normal proportions, it will exert every effort in support of this measure. This means that every man, directly or indirectly employed because of construction activities, whether as employer or employee, should make known to *his* representatives in Congress his views and his wishes on this subject.

Willard Chevalier

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WHAT ABOUT QUODDY? ***Next week,*** **an authentic article giving the history of the Passamaquoddy tidal power scheme and telling what the army engineers propose to do if and when Congress provides the money.**

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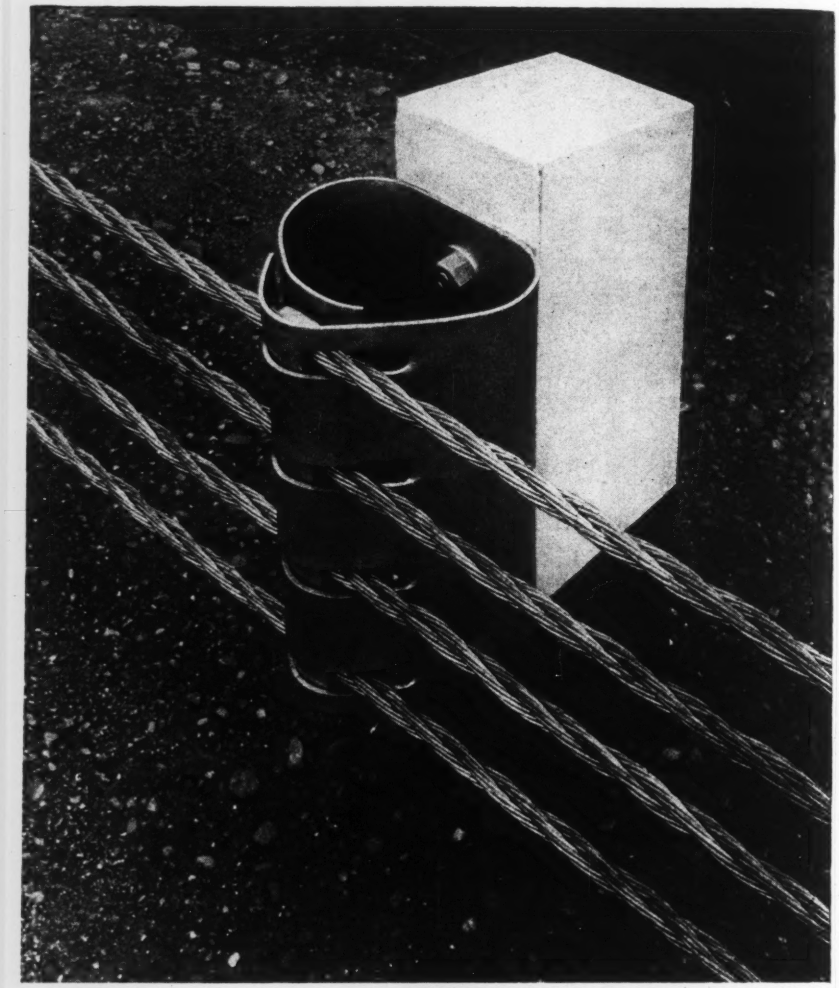

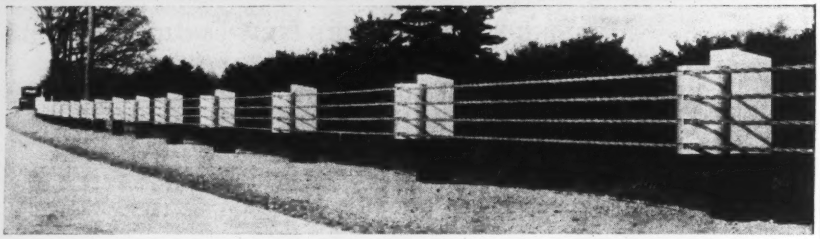

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ENGINEERING NEWS-RECORD

April 16, 1936

FIG. 1—DAY AND NIGHT CONCRETING on the lock for Pickwick Landing Dam of the TVA.

Construction Steps Up at Pickwick, Third TVA Dam

PICKWICK LANDING DAM, the third in the series of power and navigation dams to be undertaken by the Tennessee Valley Authority, combines a major earth-dam operation with concrete spillway, powerhouse and lock structures characteristic of the Norris and Wheeler Dams previously put under construction. This has introduced hydraulic fill as a major operation and a works plan determined by presumed river stages to a greater extent than in the previous all-concrete structures.

The hydraulic fill in particular is a new operation, and the process has been interestingly extended beyond embankment construction to the filling of cofferdam cells. At present the cofferdam and the embankment construction are the operations that are prominently advanced. The concrete materials-handling and mixing plants, however, are completed for all concrete, and the concrete-placing plant for the lock is in operation.

Cofferdamming for the spillway remains, but the plans are completed, as are those for delivering and placing the spillway and powerhouse concrete. The two articles that follow describe the operations in progress and those that are planned. Novelties in plant arrangement are evident that warrant notice. As in other dam work of the TVA, plant planning has been a studied operation.

Dredge Pump Operations

By S. T. Henry
Southeastern Representative
Engineering News-Record, Spruce Pine, N. C.

Pickwick Landing Dam (*ENR*, Nov. 7, 1935) is being built on the Tennessee River about 207 miles upstream from the confluence of the latter with the Ohio. At the site the channel of the river runs east and west and is between two well-defined banks rising about 40 ft. above the bed of the stream. A flood plain, some 4,700 ft. wide, extends from the south bank to higher ground, and one that is about 1,100 ft. wide lies between the north bank and a hill on that side of the valley.

A concrete spillway, 1,155 ft. long, will occupy the entire channel of the stream; the navigation lock is at the south end of the spillway, and an embankment containing about 1,235,000 cu.yd., of which 1,118,000 cu.yd. will be placed by hydraulic-fill methods, extends across the south flood plain to the higher ground. At the other (north) end of the spillway there is a powerhouse and a rolled-fill embankment between it and the hill on that side of the valley.

Streamflows of record at the site range from a minimum of about 4,000 to more than 300,000 sec-ft. High water usually comes between the end of November and early spring, although high summer stages have been recorded. A wide variation in duration of high and low flows occurs, both annually and in cycles, but with few exceptions it is possible to count on low water from September to December.

Based on these records, the construction program has been divided into three stages. The first stage includes the completion of the two embankments and practically all of the 110x600-ft. lock chamber; the second stage takes in all of the powerhouse and about 200 ft. of the total length of 1,155 ft. in the spillway structure; and the final stage will complete the spillway and lock.

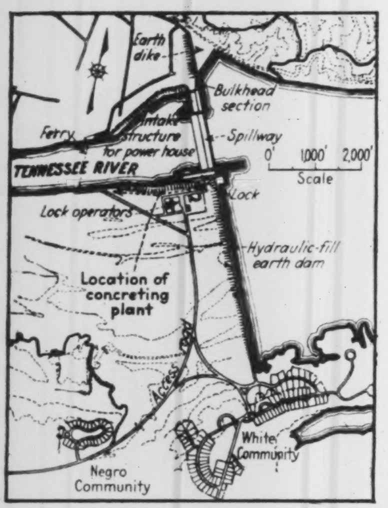


FIG. 2—SKETCH PLAN of Pickwick Dam, showing relation of parts mentioned in these articles.

Construction was started in March, 1935, when the general features of the project had been fully determined, but many important details of design remained to be completed. The schedules provided that the two embankments were to be completed to their full height, and a cofferdam enclosing the site of the lock chamber was to be unwatered before the usual beginning of high water in December.

Records showed that on the average a stage of El. 390 might be expected once in about four years. This level of water, being the average level of the flood plains, would make the construction area inaccessible. It was therefore decided to construct the cofferdam with its top at El. 390, which is several feet below what the average four-year flood stage will be when the channel is restricted by construction operations; all work in the cofferdam is planned for a minimum of damage to it in case the cofferdam is overtopped.

Substantial progress had been made on the two embankments when the cellular steel sheetpiling cofferdam enclosing the lock site was unwatered at the end of October. Pouring of concrete was immediately started, with plans calling for the lock to be completed by January, 1937, except for the upstream miter sill and guard wall. Meanwhile, excavation will proceed on the preparation of the site for the powerhouse and the adjoining end of the spillway structure.

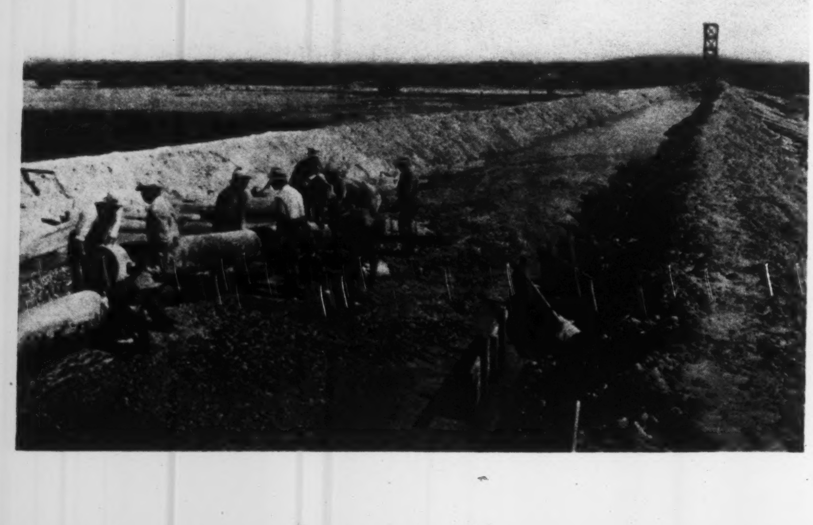
Hydraulic-fill procedure

Because of restricted stream channel at the dam, decision was made to locate the lock in an excavation in the left bank, thus leaving the entire natural channel for the spillway capacity required. This excavation for the site of the lock required the removal of about 1,500,000 cu.yd. of material ranging from silt to coarse gravel, with considerable clay included, that was satisfactory for hydraulic-fill embankment construction. The 16-in. hydraulic dredge "Dallas" was accordingly acquired to make the required excavation and deliver the spoil into the 4,700-ft. embankment across the flood plain on the south side of the river.

Ledge limestone rock underlies the south flood plain at elevations from 334 to 336 ft.; the ground surface is comparatively flat, with a rise toward the higher ground. As described previously (*ENR*, Nov. 7, 1935), a line of steel sheetpiling was driven the entire length of the site of the embankment on its axis. This sheetpiling was driven in a trench about 20 ft. deep, with sides on a 1-on-1 slope, bringing the top widths to about 35 ft.

In placing the hydraulic fill, the dredge discharge was handled in such a manner that a core of impervious material was deposited in this trench and centered in the embankment. This impervious core was carried in the embankment to above the high-water level of the reservoir that will be created by the dam. The steel sheeting along the center line of the embankment connects with the axis of the stream channel and just inside the concrete lock-chamber structure. With the impervious core of the embankment it forms the seal on that end of the dam.

FIG. 3—WING BAFFLES prevented scour of the dikes enclosing the narrow dredge discharge pool.



Placing the 1,145,000 cu.yd. of material required to complete the embankment on the south side of the valley proceeded substantially along the lines summarized in the previous article. Undesirable surface material was first stripped from the site of the fill, and dikes were thrown up along both toes of the embankment with crawler power shovels equipped as draglines.

First a section 1,250 ft. long was started next to the lock chamber; two 16-in. discharge lines were laid from the dredge lengthwise of the first section, one about 30 ft. inside each dike. After the dredging was well started, the established practice was to deliver through one line but to shift the discharge from side to side in such a manner that the fill was carried up uniformly, with a minimum of shifting of pipe and crews.

Working in this manner, the embankment was carried up in lifts of about 3 ft., the first section being completed practically to the finished height before the next section was begun. The entire embankment was thus divided into two sections that were built in succession from the channel to the high-ground end of the fill.

Stop planks built in 16-ft. lengths for convenience in handling were shifted by hand to guide the deposition of the material delivered by the discharge pipes. Under certain conditions the character of the material pumped made the use of a floating boom of timbers desirable, to avoid too rapid surface movement of the water and to drop the fine material exactly where wanted. When the embankment had been carried to a height where the width was only 50 ft., the rest of the material was placed with a single discharge line from the dredge.

To avoid scouring the dikes enclosing the discharge pool at the end of the pipe line, inclined guide boards were placed as shown by Fig. 3. A distributer baffle also was hung on the end of the pipe to eliminate scouring from the discharge. With this control it was possible to top out the embankment with the dredge practically to the finished slopes of the design.

Rolled-fill embankment

Because of the short haul and greater time available for the work, which permitted shutdowns during rainy weather, it was decided to build the embankment closing the flood plain on the north bank partly by the rolled-fill method. All of the 1,649,000 cu.yd. required to make this embankment was obtained from the site of the powerhouse and the tailrace.

The material was excavated by elevating graders drawn by tractors. The graders delivered to 10-yd. bottom-dump trailers, which hauled to place in the fill. Under the most ideal conditions the elevating grader outfit would dig and load an average of 250 yd. per hour.

Material was dumped in the fill with the tractor trailers in motion to avoid piles that would result in loose and hard spots. Each load was immediately leveled off with a tractor bulldozer to a layer averaging about 6 in. deep. The layers were then compacted by a sheeps'-foot roller to maximum consolidation.

Cellular sheetpile cofferdam

Conditions at the site of the cofferdam to unwater the lock rendered the cellular steel pile type specially suitable. The underlying limestone in the bed of the stream was covered with 6 to 12 ft. of gravel; this same limestone foundation continues uniformly across the valley. It was virtually all uncovered in the dredging operations in the excavation for the lock site that produced the material for the hydraulic-fill embankment.

By constructing a cofferdam wall of sheetpiling cells parallel with the stream channel and about on line with the original channel bank face for 1,500 ft., it was possible to close the two ends by short connections into the bank. A 300x1,500-ft. area was thus enclosed and unwatered so that the foundation for the lock might be prepared and all form and concrete work be conducted in the dry.

The intermediate short-radius sections between the larger cells (Fig. 5) were adopted to be able to complete the erection, filling and removal of any of the larger cell units independently of the others. By driving each cell independently of the other, it was possible to use the same templet over and over again for the large cells.

Piledriving for the cofferdam was started at the upstream inshore end carried downstream and closed in at the lower inshore end. The total height of the cofferdam cells in the offshore wall is 55 ft., and piles of that length were accordingly used. In all, 4,100 tons of 15-in. 38.8-lb. steel piling was used. All driving was done with two floating stiff-leg A-frame derricks; these worked together on opposite sides of the cofferdam as it progressed. Each was equipped with a steam hammer specially fitted for this kind of driving.

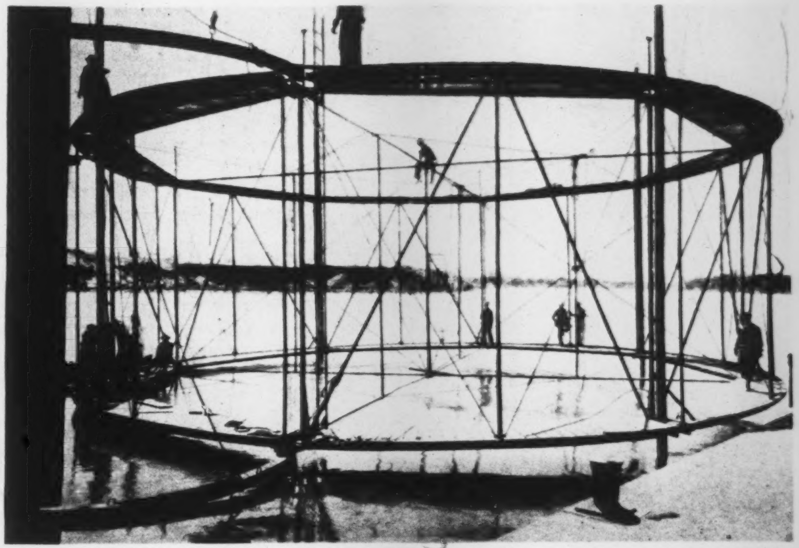


FIG. 4—BREAKDOWN TEMPLETS guided the piledriving for the cofferdam cells and gave an exceedingly neat sheetpile job, as shown by Fig. 5.

Unusual accuracy of driving was obtained, due largely to the use of a specially designed demountable double-deck structural templet. Fig. 4 gives a general idea of the design and use of this templet, which was equipped with four 10-in. pipe piles that served as guides and supports for the frame. With these piles, the templet was readily set and accurately adjusted to position. The short-radius arcs of piling between the main cells were guided in driving by steel wales attached to the last main cell wall and to the new one.

After all the piles of a cell were driven, it was filled to about the elevation of the river's surface by a clamshell bucket, and after all the cells had been driven the dredge material was pumped directly into each cell, beginning at the upstream end of the cofferdam. The surplus water flowed out through six 10-in. holes that were burned in the river side of each cell about 4 ft. from the top of the cell. Later these holes were closed and the filling was continued to the top of the cell. When all of the main cells had been filled, the smaller connecting cells were filled by hydraulic pumping.

As soon as the cofferdam was closed, it was immediatey unwatered by seven 10- and 12-in. motor-driven centrifugal pumps, some of which were then set up for permanent service on the job. No difficulty was encountered in unwatering, and since then practically the only inflow has been some seepage from the land side.

When the cofferdom was unwatered, the shallow covering of gravel and silt over the ledge-rock foundation was easily removed with power shovels. The surface of the rock was found to be such that very little of it had to be stripped.

At the start of concrete placing in the lock a temporary mixing plant was erected inside the downstream corner of the cofferdam. Floating equipment supplied this temporary plant with sand and gravel dredged from the river in the vicinity. Delivery from the temporary mixing plant to the whirleys at the point

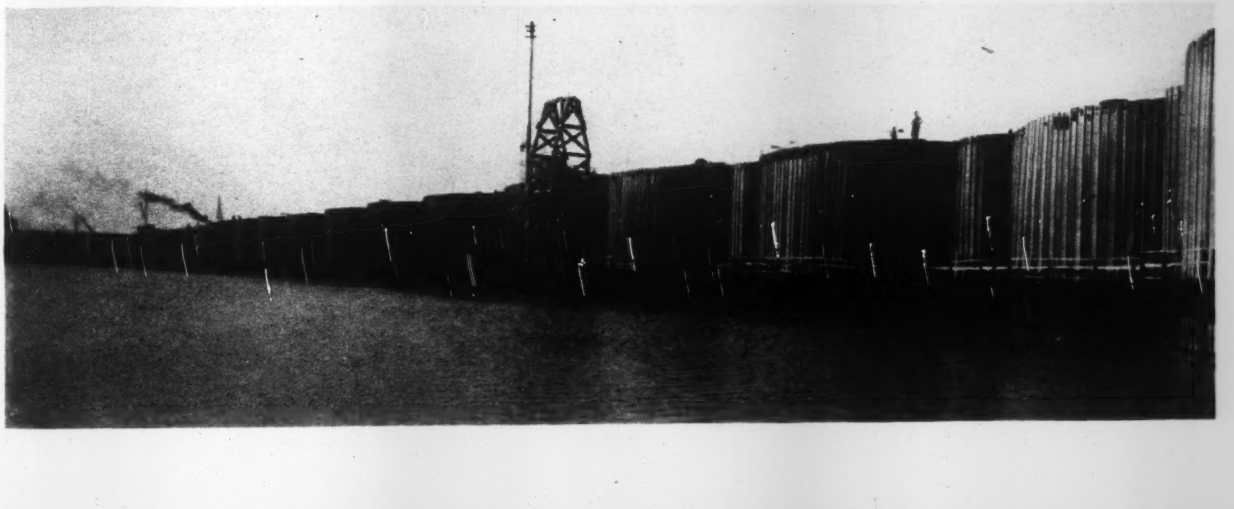


FIG. 5—COFFERDAM WALL of circular steel-pile cells connected by closure arcs of sheetpiles; the cofferdam enclosure before pumping is shown.

where placing was under way was made in buckets on motor trucks operating on the bottom of the cofferdam.

To eliminate the accumulation of hydraulic head in the cells, rows of weep holes were punched at the mill in every third pile to be used in walls on the bank side of the cofferdam. These holes were spaced 3 ft. apart and were left open unless accidentally closed by clogging. This method of draining avoided unbalanced pressures on the walls of the cells so effectively that no displacement occurred while the cofferdam was being built nor afterward. In fact, the alignment of the piling is exceptionally true and accurate.

Driving the 4,100 tons of steel piling in the cofferdam, comprising in all 4,151 pieces, was started during the latter part of August. Four six-hour shifts were employed six days a week, with very few interruptions from weather or plant difficulties. The last piles in the main coffer were down on Oct. 4. During the interval there were 28 working days, so that an average of 145 tons of piling was driven every 24 hours while the job was under way.

Arthur E. Morgan is chairman and chief engineer of the Tennessee Valley Authority. Carl A. Bock is assistant chief engineer, C. H. Locher construction consultant, T. B. Parker supervising construction engineer, Ross White, general construction superintendent, and A. J. Ackerman construction plant engineer. At Pickwick, A. L. Pauls is project engineer, R. F. Olds is construction engineer, and L. H. Huntley is construction superintendent.

Pickwick Landing Concrete Plant

By **Herbert F. Gough**
Tennessee Valley Authority, Knoxville, Tenn.

THE AGGREGATE-HANDLING and concrete-mixing plant at Pickwick Landing Dam, the Tennessee Valley Authority's mile-and-a-half-long project on the Tennessee River 53 miles below Muscle Shoals, is now completely installed, and concrete is going into the forms at the rate of 144 cu.yd. an hour.

The plant required the installation of a radial aggregate storage system, a cement blower system, and the erection of a 110-ft.-high concrete-mixing plant, all on the south bank of the river, with belt conveyors linking the steps in the process.

When construction was planned at the Pickwick Landing site, it was generally expected that the floating mixing plants at Wheeler Dam, another TVA project 68 miles up the Tennessee, would be transferred to the Pickwick job. But the plant as now installed differs radically from the Wheeler set-up.

Disadvantages in the use of the Wheeler Dam floating equipment, perfectly applicable in the slackwater at the Wheeler site, became apparent after study of the high flood stages in the Tennessee at the Pickwick site. Then, too, successful operation of the Wheeler equipment was based on the continuous operation of the sand and gravel contractor's dredge. Even were the four mixing plants taken off the barges and relocated on land, the problem of shutdowns in the dredging of gravel during seasonal high water would still be unsolved. A gravel storage system was necessary to tide over lapses in the delivery of aggregates.

A storage system of 50,000 tons capacity was planned at first, but eventually a system of five times that capacity was decided upon to permit the contractor to coordinate his operations with the seasonal flow of the river. With dredging operations entirely independent of the authority's construction schedule, the contractor would be able to cut the time of the contract and maintain a maximum of efficiency with high rate of delivery to the job during intermittent periods. This improvement of conditions in the contract was reflected in the materially lowered bids submitted to the authority.

As it worked out, the saving on the aggregates contract was sufficient to cover the cost of all of the new plant requirements under the present scheme of operation at the job. The present set-up is the result of careful study of fourteen different possible arrangements. It is shown by Fig. 2.

Belts move aggregates

The aggregates are barged to Pickwick Landing harbor from the Cumberland River Sand and Gravel Co.'s dredge and classifying plant. The dredge is now at a point 10 miles upstream from the dam site and is gradually working downstream. The authority's survey indicates that several million cubic yards of sand and gravel are available on the river bottom between a point two miles upstream and another about 1,000 ft. below the axis of the dam. The authority's contract calls for 1,000,000 tons of classified aggregates.

At Pickwick Landing harbor a stiffleg derrick and a whirley equipped with 2½-yd. clamshells transfer the material from the barges to a 40-cu.yd. wooden

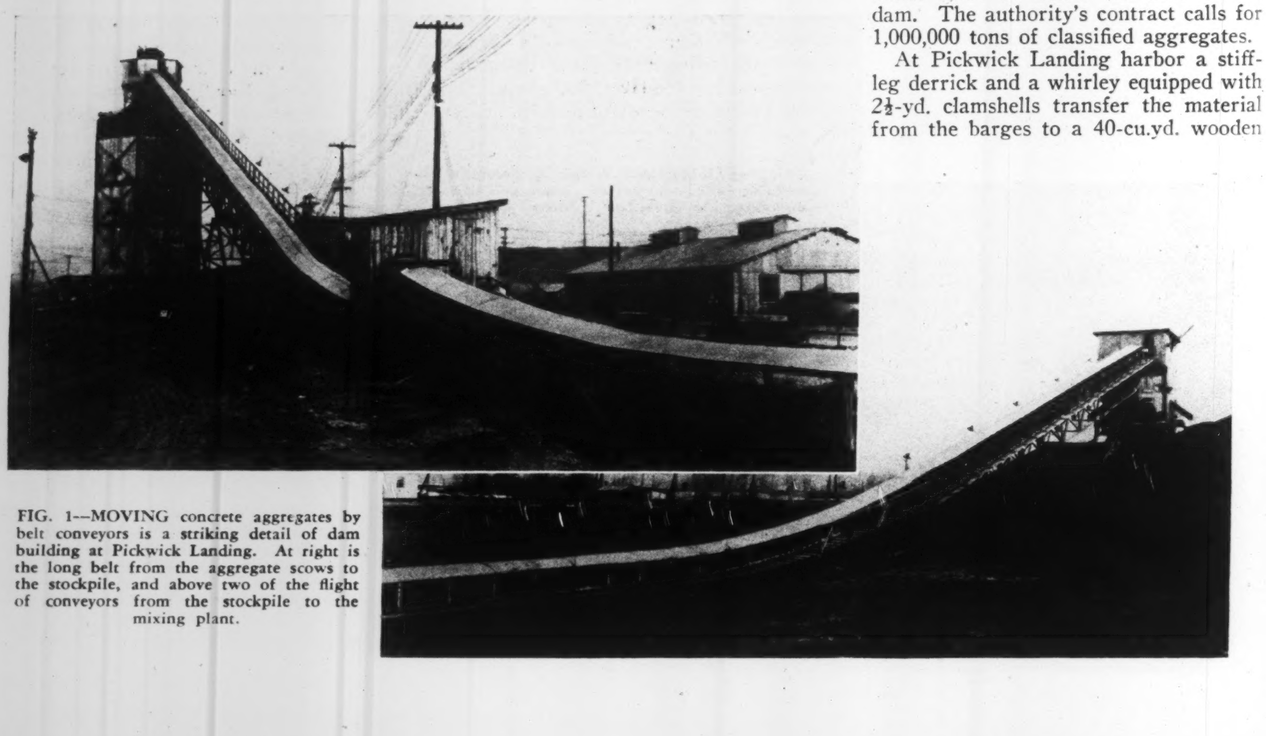
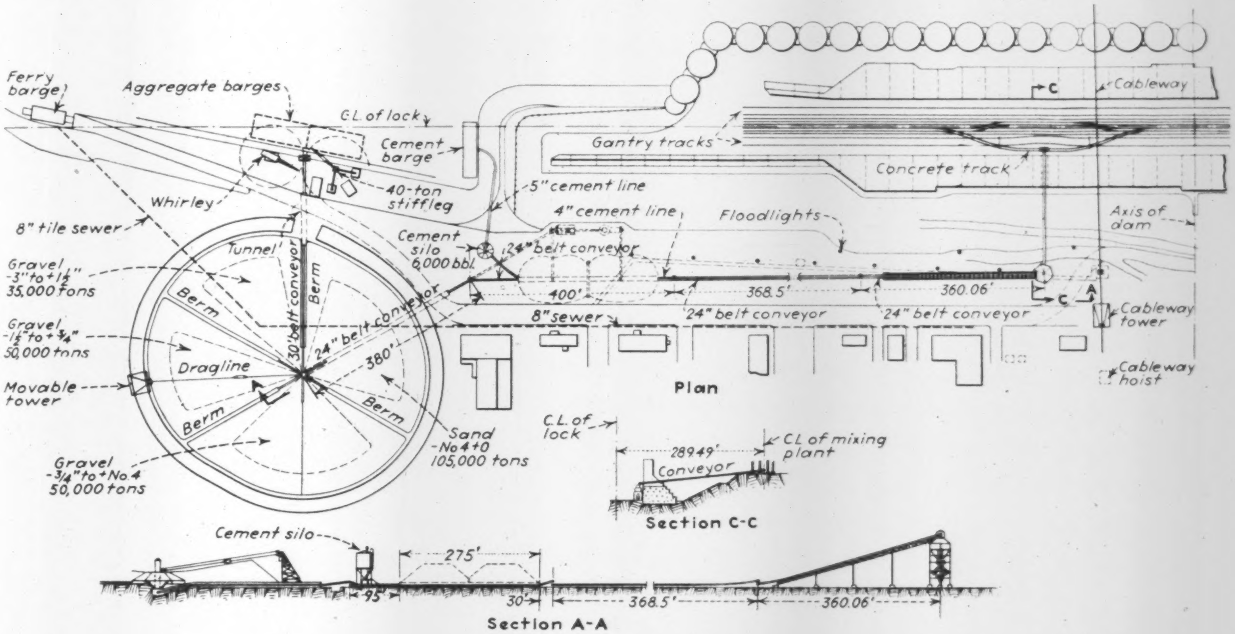


FIG. 1—MOVING concrete aggregates by belt conveyors is a striking detail of dam building at Pickwick Landing. At right is the long belt from the aggregate scows to the stockpile, and above two of the flight of conveyors from the stockpile to the mixing plant.

hopper. The hopper discharges onto an inclined 30-in. belt conveyor which carries the material to the top of the central tower of the radial storage system, about 425 ft. back from the river. This belt can handle 400 tons of material an hour.

The central tower is located in the middle of a roughly oval area made up of two semi-circles of 250-ft. radius connected by 75-ft. tangents. This area surrounding the tower is subdivided by berms into compartments to hold 35,000 tons of fine sand, 35,000 tons of medium sand, 35,000 tons of coarse sand, 50,000 tons of —¾ in. to No. 4 gravel. The belt from the hopper at the river bank discharges into a roller-mounted turnhead at the top of the central tower, and the material falls through a chute into the proper compartment.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8" tile sewer
5" cement line
4" cement line
Floodlights
Gantry tracks
Concrete track
Cableway
C
Axis of dam
Cement silo 6,000 bbl.
24" belt conveyor
Tunnel
30" belt conveyor
Berm
Berm
Berm
Berm
Gravel -3" to +1½" 35,000 tons
Gravel -1½" to +¾" 50,000 tons
Dragline
Movable tower
24" belt conveyor
380'
400'
368.5'
360.06'
8" sewer
24" belt conveyor
24" belt conveyor
C
A
Cableway tower
Cableway hoist
Plan
Sand -No 4+0 105,000 tons
Gravel -¾" to +No. 4 50,000 tons
C.L. of lock
CL of mixing plant
289.49'
Conveyor
Section C-C
Cement silo
275'
95'
30'
368.5'
360.06'
Section A-A

FIG. 2—THE CONCRETE materials handling and mixing plant at Pickwick is a closely interlocked system of conveyors, batchers and mixers.

A 60-ft.-high traveling tower skirts the radial storage area on wide-gage track and operates a 2½-yd. drag bucket between the two towers to move the storage piles back toward the outer edges of the individual compartments. The height of the stockpiles is governed by raising or lowering an adjustable "lead-in" sheave situated below the fixed sheave on the traveling tower. At the central tower the dragline cable passes around one sheave fixed in height but movable around the tower, to face any desired stockpile. Dragline operations are handled from the control cab of the traveling tower.

Only one man is needed to operate the central tower. Communication between the concrete mixing plant and the central tower may be carried on by telephone or by horn and light signals. A panel board carrying six lights, one for each type of aggregate, is located in both the central tower and at the top of the mixing plant. On light signal from the mixing plant, the operator releases the desired type of aggregate into the hopper at the bottom of the central tower onto a 24-in. belt conveyor, which takes it away toward the mixers. Control of the flow of aggregate from the tilting floor of the storage compartment into the hopper is by manually operated radial gates.

Four flights of 24-in. belt conveyors carry the aggregate in successive steps roughly parallel to the river about 1,510 ft. to the bins in the top of the mixing plant. Their capacity is 250 tons per hour, traveling at about 287 ft. per minute. The first flight in the series runs through a concrete tunnel extending to the edge of the storage area. In the future this tunnel will be buried by the sand stockpiles. Four hatches in its roof will facilitate handling of the sand later and reduce dragline operations in the sand storage area.

Air moves the cement

Cement is purchased from eight different concerns and is shipped in bulk by rail to Sheffield, Ala., and barged from that point to Pickwick Landing harbor. It is then pumped from the barges into a 6,000-bbl. elevated steel silo; both cement pumps and silo were formerly used at Norris Dam. The cement is discharged by gravity from the silo into an air-activated blower system, which propels the cement through a pipe to the concrete-mixing plant.

The blower system consists of two 55-bbl. tanks, which fill and discharge alternately every 5 min. Under present operations each is charged with 30 bbl. of cement and air at 50-lb. pressure; 1 min. is required to load and 4 min. to shoot. During the shooting the pressure is reduced from 60 to 40 lb., and 20 bbl. of cement are released through the conveyor pipe leading to the mixer plant. Thus, reloading begins before the tank is completely emptied. This cycle of timing facilitates operations. A green light system similar to that at the aggregates storage tower connects the blower system with the mixing plant and indicates when to start and stop movement of cement.

Wholly modern mixing plant

The aggregate storage bins at the top of the mixing plant have a total capacity of 750 cu.yd. A manually operated turnhead diverts the discharge from the conveyor belt into the appropriate bin. The bins discharge by gravity into the weigh-batchers on the floor below. The aggregate batchers are charged by manual operation of the controls governing the radial gates on the bins. The charging of the cement and water batchers is started by hand but stops automatically when the proper weights have been reached.

Operation of the mixing plant was started on a small scale on Feb. 22, 1936. During cold weather the water for the concrete was heated to 180 deg., and live steam was injected into the aggregates, so that the concrete was at least 50 deg. in temperature by the time it reached the forms.

The weigh-batchers discharge by gravity into a hopper, and an automatic turnhead controlled by the mixer operator below directs the flow of material into the proper mixer. On the mixing platform there are three 2-yd. mixers arranged about a central chute. The mixing cycle takes 2 min. 15 sec. to load, 90 sec. to mix, and 15 sec. to discharge. Four different mixes of concrete and one of grout are used.

Batching and mixing operations in the plant are coordinated by electric-light signal systems, and the operator in charge of the entire plant is in telephone communication with a man at the forms to receive orders on when to start or stop operations and on what particular mix is required.

Concrete is delivered in three ways

Delivery of concrete to the forms varies with the three stages of construction. The first stage is the building of the navigation lock, now under way, and a single flight of 30-in. belt conveys the concrete about 245 ft. to a track hopper just inside the edge of the lock. This hopper discharges into 4-yd. roller-gate concrete buckets standing on a railway flatcar beneath. Three gasoline locomotives haul the loaded flatcars to points where the buckets are picked up by whirleys and swung to the forms. One of these locomotives was transferrred to the Pickwick job from Norris Dam. Three whirleys are used in the lock. One large one, mounted on a 34-ft. gantry and equipped with a 115-ft. gooseneck boom, places the concrete. The two smaller cranes, mounted on 35-ft. gantries and using 95-ft. gooseneck booms, handle the forms. These smaller units, with the exception of the booms, were transferred to Pickwick Landing Dam from Wheeler Dam. One of these smaller whirleys is sometimes used for placing concrete also.

The second stage of concreting takes place in cofferdam No. 2, which will be built out from the north bank of the river to surround the powerhouse area and part of the spillway section. During this stage the belt conveyor carrying the concrete away from the mixing plant will run roughly parallel with the lock to a stationary hopper situated at the downstream foot of the south earthfill of the dam. Here 4-yd. drop-bottom buckets loaded from this hopper will be picked up by a stationary cableway.

The headtower of the cableway will be located on the south bank about 280 ft. back from the land wall of the lock. It will be 150 ft. high, set up at El. 392. The track cable will extend 1,500 ft. across the river to the 110-ft. tailtower, erected at El. 336 in the south end of cofferdam No. 2.

The cableway bucket will deposit its load into a stationary track hopper located in front of the tailtower. This is turn will discharge into the roller-gate buckets waiting on the railway flatcar beneath. From this point on placement of concrete in the second cofferdam area will be similar to the method now in use in the navigation lock. The three whirleys now in the lock will be transferred across the river, and an additional crane will be added from Wheeler Dam. Besides the largest unit, which uses a 4-yd. bucket, one of the smaller whirleys carrying a 2-yd. bucket will be used in concrete placement. The remaining two whirleys will handle the forms.

Two alternatives for third cofferdam

Two methods present themselves for the placing of concrete in the third cofferdam area. Cofferdam No. 3 will enclose the spillway section spanning the main channel between lock and powerhouse section.

The first possibility is to use the cableway as it will be set up for the second-stage operations, but to discharge into a movable rather than a stationary hopper. The convenient location of th cableway makes it possible in this stag to dispense with the flatcar and railroa and run the hopper itself on rails beneath the cableway. Transfer of th concrete to the forms would be b crane, as in the earlier stages referre to above.

The second possible method involv extending the conveyor from the mixin plant to the top of the south earthfi section of the dam and moving the cabl-way towers upstream about 150 ft., s that the track cable is about over th axis of the dam. Concrete could the be lowered to the forms direct from th cableway, the bucket being drifted laterally to reach unusual points of placement. This arrangement would dispens with both traveling hopper and the us of all cranes except those handlin forms.

The two methods are practically equa in cost, and one or the other will b used. In all probability, if it is decided to place the cableway over the axis of the dam, it will be used ther for the second stage of concreting a well as the third. This procedure ha the advantage of entailing no major change in the proposed plan.

Personnel

A. E. Morgan is chairman and chief engineer of the Tennessee Valley Authority. C. A. Bock, assistant chief engineer, has direct charge of all TVA engineering and construction. He is assisted by Theodore B. Parker, supervising construction engineer, and Ross White, general construction superintendent. C. H. Locher is construction consultant, and A. J. Ackerman construction plant engineer. A. L. Pauls is project engineer on Pickwick Landing Dam. Located at the dam are R. F. Olds, acting construction engineer, and Lee H. Huntley, construction superintendent.

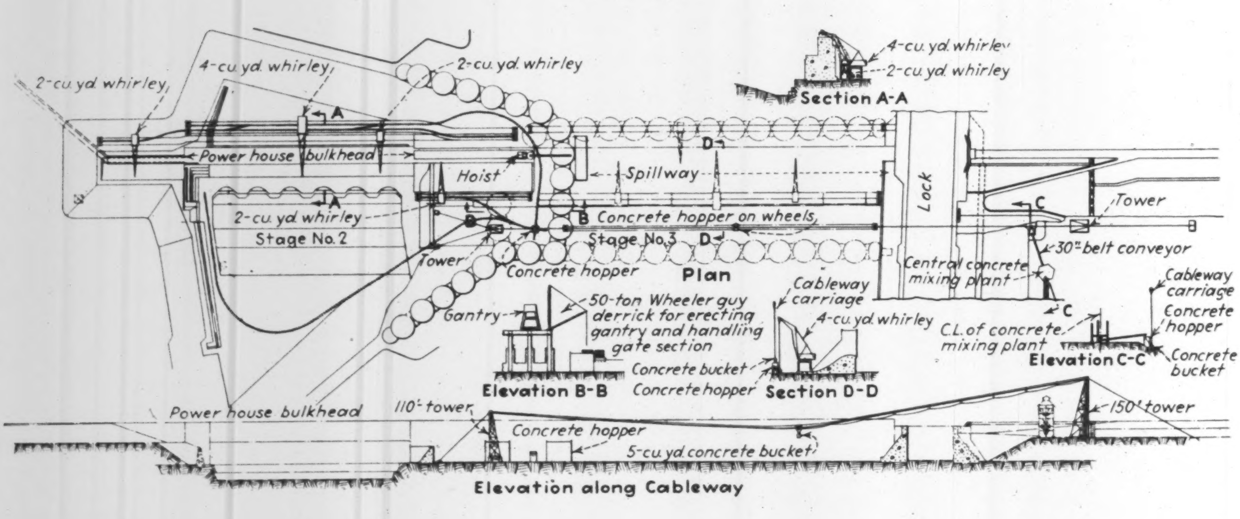

2-cu. yd. whirley
4-cu. yd. whirley
2-cu. yd. whirley
A
Power house bulkhead
Hoist
Spillway
D
4-cu. yd. whirley
2-cu. yd. whirley
Section A-A
Lock
Tower
C
A
2-cu. yd. whirley
Stage No. 2
B
B Concrete hopper on wheels
Stage No. 3
D
Tower
Concrete hopper
Plan
30" belt conveyor
Central concrete mixing plant
Gantry
50-ton Wheeler guy derrick for erecting gantry and handling gate section
Cableway carriage
4-cu. yd. whirley
C
C.L. of concrete mixing plant
Cableway carriage
Concrete hopper
Concrete bucket
Concrete bucket
Concrete hopper
Elevation B-B
Section D-D
Elevation C-C
Power house bulkhead
110' tower
150' tower
Concrete hopper
5-cu. yd. concrete bucket
Elevation along Cableway

FIG. 3—CONCRETE PLACING as it is in operation at the Pickwick locks and as it is planned for the spillway and powerhouse bulkhead.

Prestressed Reinforcement for Domed Concrete Tanks

By J. M. Crom
Vice-President, National Gunite Contracting Co., New York, N. Y.

A NUMBER of concrete tanks have recently been built at an eastern paint company plant in which the reinforcing rods have been prestressed, to the end that considerable loads are carried by relatively thin sections and that cracks from tension and shrinkage are eliminated. The most unusual feature is the use of concrete dome roofs 60 ft. in diameter, which carry a central concentrated load of 20 tons in the form of a revolving scraper mechanism. The thickness of this dome shell is 4 in., and its design is possible because of the preloading of the band steel around its edge to take the horizontal thrust. Poured concrete is used in the dome, while the tank shell is of high-strength air-applied concrete. The vertical and horizontal rods of the tank shells are also prestressed.

In the particular preload method used, the steel is in the form of smooth rods provided with upset threaded ends and sleeve nuts and coated with a special asphaltic compound, to prevent any bonding with the concrete. In the dome the rods were connected together during construction to form an endless steel band around the outer edge. Then after the poured concrete had set, the sleeve nuts were turned to stress the rods a definite amount corresponding to the elongation that would take place under full load. Since these radial inward stresses balanced the outward thrust due to the dead and live loads of the dome, removal of the centering placed no additional load on the rods; in effect, the tightening of the rods unloaded the centering prior to its removal. There were no subsequent deflections or distortions.

Contrast to usual procedure

It is to be noted that under conventional design methods, without preloading, removal of the centering would throw all of the horizontal thrust into the band rods. For each pound of load applied, the rods would elongate a definite amount and the concrete (being bonded to the rods) would stretch the same amount. The resulting stress in the concrete would have the same relation to the steel stress that the moduli of elasticity of the two materials have. With the steel loaded anywhere near its working stress, the resulting tension in the concrete would cause cracks and perhaps failure.

It will be noted from the accompanying illustrations that the central portion of the dome is conical. By this arrangement the bending stresses, introduced by the large concentrated load at the center, are made nominal. Otherwise a thickness of about 12 in. at the center would have been necessary.

In the tanks the tightening of the hoop rods compressed the walls, decreasing the circumference. Then when the tank was filled, the outward pressure of the liquid counteracted the compression and returned the tank to its original circumference; this left the concrete neutral except for punching shear and increased the unit stress in the steel to its design value.

In stressing the vertical rods in the tank shells, they were tightened sufficiently to produce a unit compression of about 200 lb. per sq.in. in the concrete. This eliminated the possibility of horizontal cracks from temperature differences between the inside and outside portions of the walls.

High strength reinforcing

Prestressing of reinforcing steel suggests the possibility of using higher-strength steels, and this has been progressively demonstrated in the concrete tanks. For the first tank built, an 18,000-lb. per sq.in. working stress was used. Later tanks, using a steel with a minimum yield point of 50,000 lb. per sq.in., were designed on a 30,000-lb. unit working stress basis.

For additional tanks now under design the working stress is fixed at 40,000 lb. per sq.in., using a steel with a minimum yield point of 60,000 lb. Use of a high unit stress reduces the amount of steel required; and since the price per pound for the steel is the same, a considerable saving is affected. It is to be noted that, since the rods are loaded almost to full capacity prior to application of live load, dangerous elongation of the steel is eliminated.

The tanks were designed and built by the National Gunite Contracting Co., New York City.

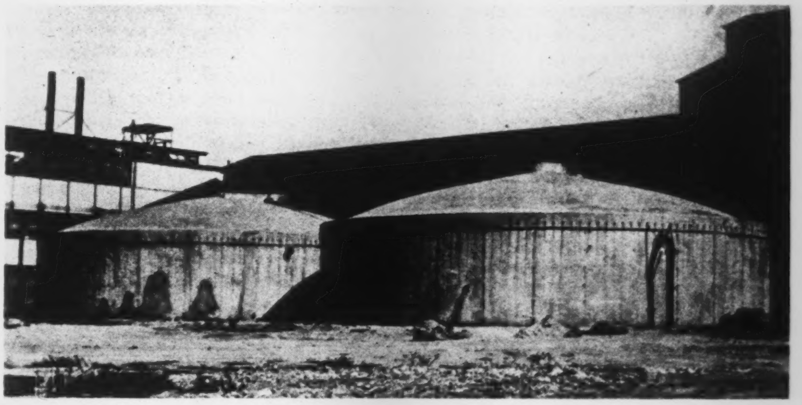
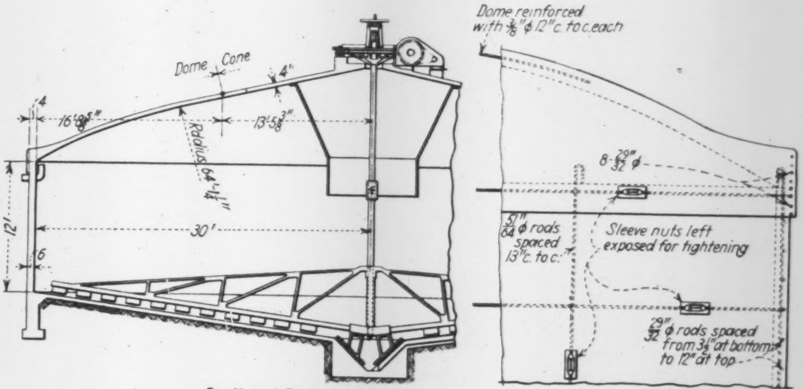


FIG. 1—CONCRETE TANKS, built with pretressed reinforcing, which exhibit no cracks from temperature shrinkage or loads after many months' service. The liquid contained in the tank averages 180 deg. F. and weighs 105 lb. per cu.ft.



Dome
Cone
4"
4
16'-8 5/8"
13'-5 3/8"
Radius 64'-1 1/4"
12'
30'
6
Dome reinforced with 3/8" ϕ 12" c. to c. each
8-29/32" ϕ
51/64" ϕ rods spaced 13" c. to c.
Sleeve nuts left exposed for tightening
29/32" ϕ rods spaced from 3 1/2" at bottom to 12" at top

Sectional Elevation

Methods of Reinforcement

FIG. 2—CONCRETE DOME 4 in. thick and 60 ft. in diameter, which supports a 20-ton load at the center. Rods around the edge of the dome and all tank shell steel were prestressed.

Solving a Dam Break by Deduction

Cause of unwitnessed overtopping determined by rain-gage records, runoff calculations and levels of remaining structures

By P. E. Green
Consulting Engineer, Chicago, Ill.

HERRIN, a city of southern Illinois having a population of about 10,000, is served by a water supply reservoir formed behind an earth dam located on Little Wolf Creek 12 miles south of the city. On the night of June 21-22, 1935, after an unusually rainy spring, a torrential rain occurred, described by the "oldest inhabitants" as the worst rain that they had even seen, and the dam, an earth structure 700 ft. long, 40 ft. in maximum height and having a puddle corewall, was washed out. The concrete spillway, 100 ft. wide, of 4-ft. effective depth and located at the east end of dam, was not damaged.

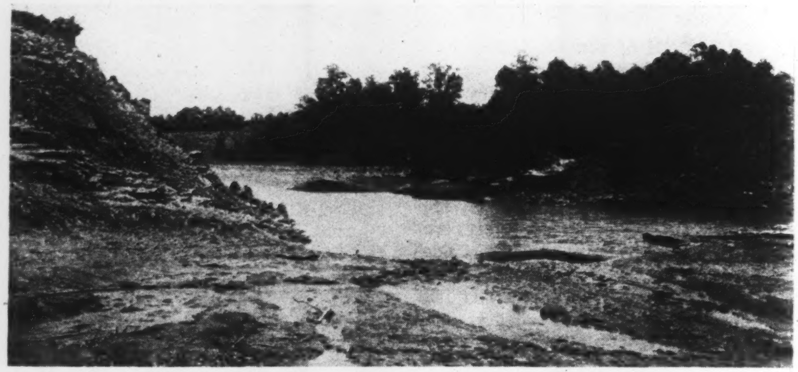
Since the failure was unwitnessed, its cause had to be determined by other evidence. Accurate information was important because reconstruction was contemplated, but it was made difficult to secure as no investigation was undertaken until some time after the failure.

Rainfall the first question

The territory in which the reservoir is located is rather rough and rolling, with a sandy-clay soil, the low hills are wooded and have rather steep slopes, and the valleys are long and narrow and are covered with grass, brush and some timber. The hills are 60 to 100 ft. high. The 2,000 acre watershed is somewhat over 4 miles long and a mile wide. The fall is 320 ft., or 80 ft. per mile along the thread of the stream.

No rain gages are located at the reservoir or on the watershed, but rather numerous government and state rainfall stations are scattered between St. Louis on the west and the Indiana line to the east and at various towns north and south of the site, with more or less continuous records for 100 years. The nearest gage is at Carbondale, 12 miles to the southwest.

Data were collected from all of these stations, and while the records were only for 24-hour periods, with casual observations as to the maximum hourly rainfall, it was clearly evident by plotting the location of these rainfall stations that the total was not less than 6 in. at Herrin over a period of six hours, with a probable maximum rainfall of 4 to 5 in. in two hours. This rain fell on a territory that was already saturated because of the extreme spring and early summer rainfalls.


BREAK of 200 ft. in 40-ft. dam due to settlement that dropped top halfway down to spillway depth.

The maximum rainfall for the last 100 years in the records for the St. Louis station in any 24-hour period was 7.02 in. in 1919. At Cairo, Ill., 50 miles to the southwest, it was 5.69 in in October, 1910, and at West Frankfort, some 20 miles to the north, the record was 6.25 in. in September, 1931. At Carbondale on June 21, 1935, 5.57 in. of rain fell, and at New Burnside, 15 miles southeast of the reservoir, 6.22 in. fell during the same period. The storm evidently moved from east to west, as north of Herrin at West Frankfort the storm amounted to 2 in., and at Benton, 10 miles farther north, to but ½ in., while to the east and west the station records show a 6-in. storm.

These records, while scanty and capable of no exact determination as to rate of fall and only approximations as to length of storm, do indicate that during the past 100 years the maximum rainfall that has occurred in any 24-hour period was about 8 in. (Chester, Ill., 8.06 in.; St. Louis, Mo., 7.02 in.; and Golconda, Ill., 7.99 in.). It was not determined what the maximum might have been for the usual 500-year period, as it was not particularly pertinent to this examination, but it is doubtful if in this climate and territory there has been any great excess over 8 in. in any 24-hour period.

Runoff the second problem

The probable runoff on Little Wolf Creek was determined by examination made of the Carbondale Reservoir, 12 miles to the south, where the same amount of rain fell between the same hours. The Carbondale Reservoir has a watershed of 1,800 acres, the topography is very similar, the spillway is identical, and observations made by the attendant at the spillway indicated that at the maximum it was running 3½ ft. deep. The dam was not overtopped, and the spillway passed the storm successfully, though it was obstructed by a fishnet extending across it. The maximum capacity of the spillway at the Herrin Dam is 2,660 sec.-ft., and the crest 4 ft. below the planned top of the dam.

The runoff of the area was computed by many well-known standard runoff formulas, such as the Rational, Kuichling, Metcalf & Eddy, the Burkli-Ziegler, Fuller and McMath, and also from cross-sections across the valley, tied in

RAINFALL RUNOFF AS ESTIMATED BY VARIOUS FORMULAS AT HERRIN DAM

(Drainage Basin, 2,000 Acres)

	Sec. Ft.	Remarks
Rational formulas		
$c = 0.20$	667	Ground saturated. Rainfall, 6 in.
$c = 0.40$	1,475	V of nucleus = 1 ft. per sec.
$c = 0.60$	2,341	N of channel = 0.035
$c = 0.80$	3,255	
Metcalf & Eddy formula	326	
Kuichling formula	1,000	Area less than 1,000 miles, topography rather hilly, similar to Herrin.
Fuller formula	400	
McMath formula	500	
Carbondale spillway (Observation)	2,100	3½ ft. deep in spillway. Rainfall 5.57 in. Spillway obstructed. Drainage basin 1,800 acres.
Herrin spillway (computed)	1,475	Discharging at crest elevation of dam at center before destruction. Same storm as at Carbondale.
Herrin drainage basin		
Moyer method, Dayton type of storm	2,072	Average rainfall 1½ in. per hour for 4 hr.
Moyer method, ordinary extreme storm	324	

with the high-water marks. The variations in the results from the same assumptions were great, and that of the flow indicated by the high-water marks was the most unreliable of all, probably because of lack of accuracy of such marks. Of the empirical formulas it is believed that the Kuichling formula for a territory less than 100 square miles was the most nearly applicable, since the topography from which it was determined appeared similar to the Herrin area. The result most nearly checked with the Rational formula, which indicated that the runoff for a 6-in. rain equaled 1,475 sec.-ft., with a nucleus velocity of 1 ft. per second. At the Carbondale Reservoir the discharge of the spillway was apparently 2,100 sec.-ft. if it had not been obstructed, but because of the fishnet previously referred to and the vagueness of observation this figure is thought to be too high. The accompanying table shows these calculated results.

The conclusion finally reached is that this watershed with a 6-in. rain extending over six hours or less, had, on June 21-22, a runoff of not less than 1,500 sec.-ft., and that under a certain assumed maximum combination of rains it might run to a total of 2,400 sec.-ft. It would appear then, since the spillway capacity was 2,600 sec.-ft., that it was sufficient to pass the flood of that date and that the dam failed from overtopping or structural weakness, due to settlement or leakage, or both.

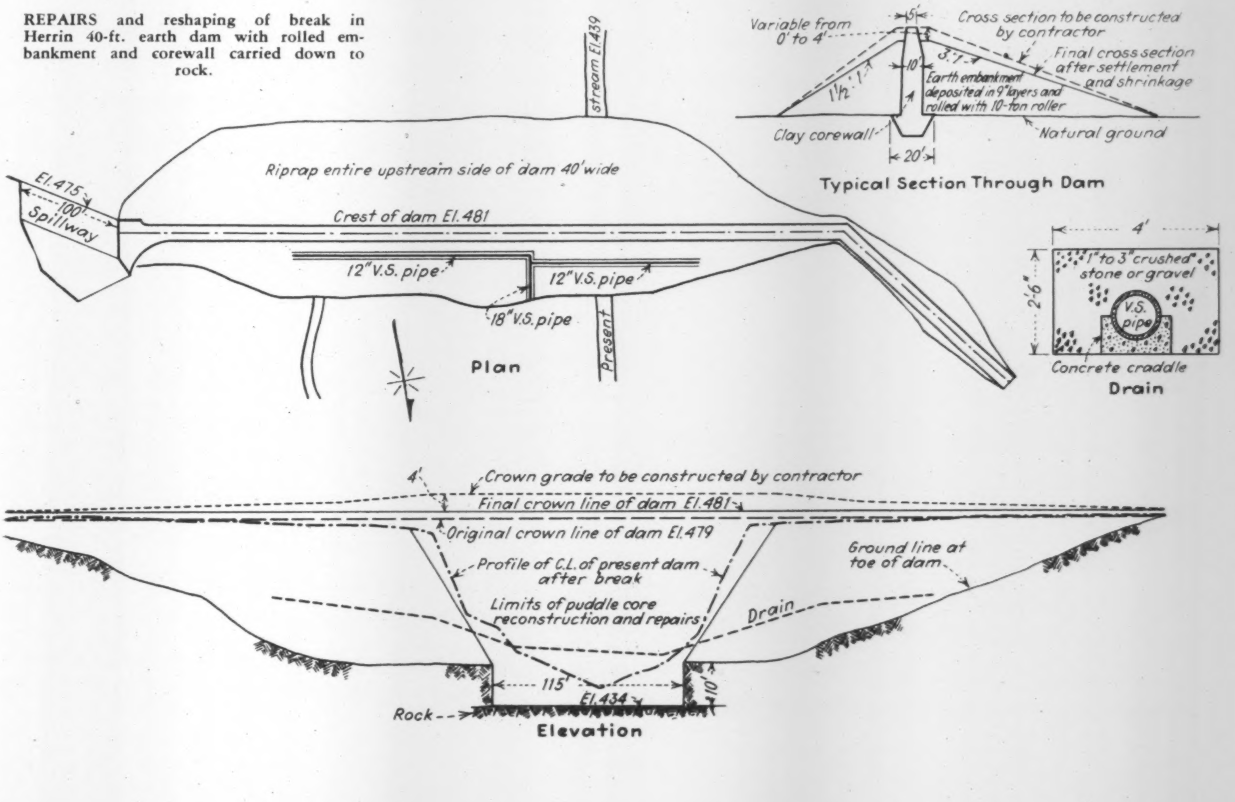
Levels taken over the damaged structure and throughout the valley were plotted to a large scale, and the profile of the original structure of which there was a complete record was superimposed over the plot. The indication was plain that the dam had settled more than 2 ft. at its central point, and if this were true it was evident that when the spillway was running about half full, carrying about 1,500 sec.-ft., the water would begin to run over the earth dam with the inevitable effect of destroying it. Examination of the wrecked structure showed that the part that was washed out was sharply defined, and that for 100 ft. on each side of the break to the ends no cracks were found along the crest or in the dam, and no evidence appeared that it had settled after the washout.

Deducing cause of settlement

Having determined these facts, it was desirable to find out why the rolled-earth structure had settled to such an unaccountable degree. The dam structure was 20 ft. wide on top, had a maximum height of 40 ft., an upstream paved slope of 1 on 3 and a downstream slope of 1 on 1.7. Generally, settlement in such a structure is small. Since no attendant was employed regularly at the dam and it had been nobody's business to make a regular examination of the structure, the reasons for settlement are rather obscure. The dam had been constructed as a rolled-earth structure and a corewall had been built by taking the sandy clay from the vicinity, dumping it in the center trench and keeping it constantly wet. No particular effort had been made to grade the material, and dependence was placed entirely on the settling and consolidating effect of the water in the trench during construction. Below the wrecked structures were found numerous large balls of blue clay that had been washed away in the storm, and this indicated that the corewall was good, as these lumps were from 2 to 3 ft. in diameter after they had been rolled several hundred feet by the waters. Doubts as to the uniformity of this corewall were raised by the lack of care in the selection of material for its construction.

No lines of drainage had been constructed on the downstream face of the dam to reduce the line of saturation. An inquiry made as to whether any of the employees of the water company had ever noticed a saturated condition or sloughing on the downstream slope indicated that there was none, but due to the fact that this testimony was by employees it was not considered entirely reliable. Comparisons of the present structure with the original plans and a report on the finished dam before acceptance indicated that no particular sloughing of the downstream slope took place, and while the line of saturation was probably fairly high yet it apparently at no time was high enough to appear on the slope of the dam. But plats of longitudinal levels made at the site did show quite a kick-up along the edge of the downstream toe.

REPAIRS and reshaping of break in Herrin 40-ft. earth dam with rolled embankment and corewall carried down to rock.


Present stream El.439
Riprap entire upstream side of dam 40' wide
El.475
100'
Spillway
Crest of dam El.481
12" V.S. pipe
12" V.S. pipe
18" V.S. pipe
Plan
Variable from 0' to 4'
5'
Cross section to be constructed by contractor
3:1
Final cross section after settlement and shrinkage
10'
1½:1
Earth embankment deposited in 9" layers and rolled with 10-ton roller
Clay corewall
Natural ground
20'
Typical Section Through Dam
4'
1" to 3" crushed stone or gravel
2'6"
V.S. pipe
Concrete craddle
Drain
4'
Crown grade to be constructed by contractor
Final crown line of dam El.481
Original crown line of dam El.479
Profile of C.L. of present dam after break
Limits of puddle core reconstruction and repairs
Ground line at toe of dam
Drain
115'
10'
El.434
Rock
Elevation

The corewall at its deepest point had not been carried to a rock foundation when constructed, though such rock outcropped on the side slopes of the dam, and test pits proved it was within 5 ft. of the bottom of the old core. The soil of the creek bottom at the point was largely blue clay; which is generally quite impervious to water, but when once a channel is formed through it, it becomes a source of large leakage. It is believed, therefore, that the weight of the central part of the dam caused a subsidence in this blue clay, and that while the corewall was generally tight yet at some point a channel must have been formed through it or below it which raised the line of saturation, caused the dam to settle heavily and resulted in its destruction when a heavy enough rain occurred to tax the capacity of the spillway only one-half.

The final conclusions were as follows: (1) the runoff from this drainage area of 2,000 acres was at least 1,500 sec.-ft. and may have been 2,400 sec.-ft.; (2) the spillway is adequate; (3) the sand and clay corewall, though generally of good construction, was probably not of uniform construction, and as a result at certain points over the deepest portion of the dam there was percolation through it, adding to the probability of settlement; and (4) the body of the dam had settled at least 2 ft.

The dam is now being rebuilt, using the same cross-section but grading the corewall materials, carrying the wall down to rock and providing downstream slope drainage. The examination, surveys and plans for repairs were made by George H. Anderson, civil engineer, Herrin, Ill., with the writer as consultant.

Concrete Roof of Novel Design for San Francisco Warehouse

A ROOF recently built on a two-story warehouse at San Francisco consists of concrete joist construction in three parts, arranged in vertical section like the members of a three-segment arch. The roof has a span of 44.33 ft. and a length of 70 ft. The center segment is at a level 8 ft. above the lower edges of the sloping slabs. There are only four columns, one at each corner. Side walls are 9 in. thick; end walls 6 in. thick. The roof slab is 2½ in. thick; the joists are on 2-ft. centers and have a 4x8-in. cross-section.

The concrete joists shown in the accompanying picture are designed to span only the 16-ft. width in each of the three segments. Components of the reactions that lie in the planes of the two sloping segments are carried by these segments acting as girders to resist the stresses tending to spread the side walls. These "segment girders" transfer tension to the end walls where the necessary steel in the form of reinforced bars is provided. Shearing stresses developed in the roof slab and the end walls are taken care of by the proper use of steel.

The roof was calculated for a wind load of 15 lb. per sq.ft. and a live load of 20 lb. per sq.ft.; its weight is about 39 lb. per sq.ft. Faces exposed to the weather are covered with emulsified asphalt.

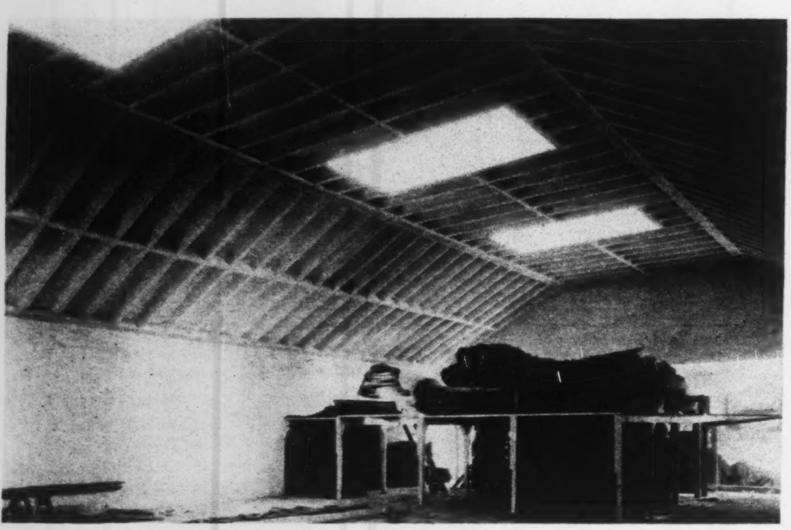
When the shoring was removed, the center portion sagged a maximum of $\frac{1}{8}$ in., and each side wall moved outward (spreading action) a scant $\frac{1}{16}$ in. at the midpoint. When the sun warmed the roof, the expansion caused the center to rise enough to return to its original position. The lateral spread, however, was not decreased.

Advantages claimed for this type of roof include the absence of columns, which gives a maximum usable floor space; absence of trusses with resultant maximum headroom; adaptability to architectural treatment; facilities for better lighting and ventilation; less fire risk and smaller cost than for corresponding construction with trusses.

The forms were shored in the usual manner from the floor below, and the only extra cost involved over a similar roof slab on truss supports was about $150 worth of reinforcing steel. Steel roof trusses with supporting columns for this roof would have cost not less than $600. Hence there was a saving of about $450, or about 15c. per sq.ft. for the type of construction used.

The structure was designed by L. H. Nishkian, consulting engineer, San Francisco, Calif.

INTERIOR VIEW of three-part concrete-joist construction. The absence of trusses or column supports gives maximum usability of building space.



Smoke Abatement Activities in Hudson County, N. J.

MORE than $1,000,000 in cash has been saved by fuel users of Hudson County, N. J., as a direct result of smoke abatement activities, according to the annual report of William G. Christy, smoke abatement engineer for the county. For 1935 the fuel saving brought about by plant improvements was estimated at $247,000, and the accumulated saving for the preceding four years totaled $754,000. This gives a total of $1,001,000, representing the dividends paid on smoke abatement since a Department of Smoke Regulation was established five years ago.

It was reported that violations on the part of industrial plants had decreased 93 per cent in five years and railroad smoke was reduced 95 per cent. The average locomotive smoke density for 1935 was 1.727 per cent, compared to 16.03 per cent in 1931. Reports from other cities, it was stated, show that the railroads operating in Hudson County, N. J., are making less smoke than in any other large railroad center where steam locomotives are used.

Fees collected for permits and certificates amounted to $8,801, representing 31 per cent of the smoke department's budget.

Alabama Modernizes Its Roads by Three-Way Financing

A unique partnership of state, counties and federal government is putting excellent surfaces on hundreds of miles of unpaved roads at moderate cost

By James A. Baird
*Assistant Division Engineer,
Alabama Highway Department, Montgomery, Ala.*

UNDER an effective system worked out by the state highway authorities in cooperation with the federal Works Progress Administration and the counties, a large mileage of road improvement is being carried on in the state of Alabama. Relief labor is used, but as the nature of the plan removes the cost limitations fixed by the WPA the work includes a trunk line and other high-type roads.

The basic idea of the plan was suggested by R. D. Jordan, division engineer of the state highway department. It was worked out to practical application under direction of H. H. Houk, chief engineer of the department, and is in direct charge of F. A. Salmon, second assistant engineer.

The distinctive features of the plan are: (1) division of the cost—one-third to the state highway department, one-third to the county in which the improvement is located, and one-third to the Works Progress Administration; and (2) development of a system of construction that produces a remarkably sturdy surfacing for $6,000 a mile. The account of unusual financing and construction follows. —EDITOR.

TO UNDERSTAND clearly the origin and necessity of the three-way paving plan in Alabama, it is necessary to analyze the state highway department's financial status, the history of highway construction in Alabama and the condition and type of highways existing over the state.

It was not until 1922 that the state highway department launched a planned construction program. The legislature authorized a $25,000,000 bond issue to finance the construction. This was spent primarily to provide as many miles as practicable of graded, drained and temporarily surfaced highway. The bond issue of 1922 was supplemented in 1927 by an additional $25,000,000, and although design and location were considerably improved throughout the second program, the demand for temporary surfaced highways was so great as to prevent the expenditure of any appreciable sum for paving.

Since the completion of the highway program authorized in 1927, Alabama, due to depressed economic conditions, has been able to show little progress in paving. Although the federal government has been liberal in outright grants for highway construction, in view of the policy of distributing the projects throughout the state to provide maximum employment, thus necessitating the limiting of each project to a few thousand dollars expenditure, little progress has been made in providing continuous pavements.

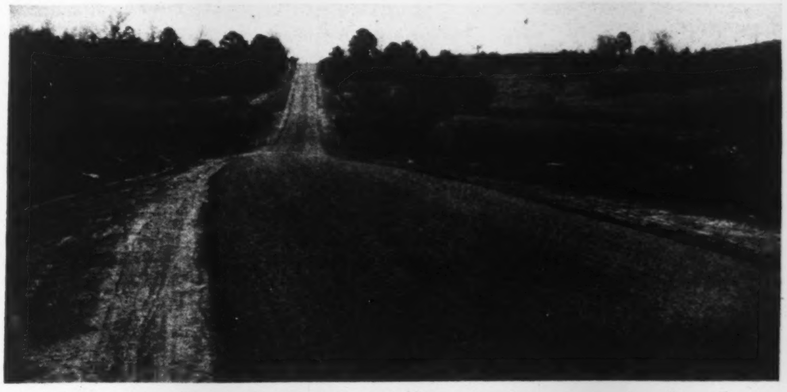


FIG. 1—ALABAMA'S THREE-WAY PLAN is putting fine year-around surfaces on hundreds of miles of graded earth roads within a $6,000-a-mile cost limit.

Although it is true that a statement of the miles thus completed seems impressive, the small projects are almost entirely lost in the maze of Alabama's gravel road system.

A better plan sought

In view of the above and with advance information on the 1936 Works Progress Administration's highway program, indicating that it would be difficult due to labor restrictions to construct paved highways from the funds available, the highway engineers in conjunction with the Alabama Relief Administration and representatives of the various counties evolved the three-way paving plan.

An agreement was reached whereby each county would contribute one-third of the cost of paving projects within its boundaries. The county is permitted to designate the particular section or sections of state highway that it prefers for immediate paving. The county also has the choice of spending its one-third contribution on either equipment or material for the project. The only restriction imposed by the state is that each road must have been graded so that it will be possible to pave at a cost of approximately $6,000 a mile.

To provide employment for persons on relief rolls, the Alabama Relief Administration agreed to contribute one-third of the cost of paving provided that labor costs should approach one-third of the total expenditure and that all labor so far as practicable be selected from relief rolls.

The state highway department contributes the remaining one-third from its general fund and retains complete control of the design and supervision. It was the purpose of the highway department in promoting this plan to secure county support by putting the cost of the pavement at an attractive figure; the sum of approximately $6,000 per mile was decided on after careful analysis indicated that it would be possible to construct a surface-treatment pavement for this amount.

Every effort has been made to simplify the organization of the three-way plan, to promote efficiency and to avoid excessive overhead costs. The construction is handled through the regular channels of the highway department with the addition of one assistant chief engineer in direct charge of the three-way plan. The organization of each individual construction crew, the design of the project and the supervisory control of construction activities are handled through the division offices. Extreme care is exercised in selecting the superintendents, as each must be a practical construction man with considerable engineering ability. The superintendent selects his subordinates, foremen, timekeepers and laborers from the local relief rolls in so far as capable men are available. It is frequently necessary to employ foremen and some few skilled laborers who are not upon the relief rolls in order to expedite the project.

It is not considered necessary to maintain an engineering organization on the project. The necessary engineering is handled through a floating party covering several projects and acting only in an advisory capacity. It is also customary to maintain a capable inspector on the project during the progress of base course and paving operations. The inspector selected for these duties is an experienced man taken from organizations functioning on federal aid work, and is directly responsible for the quality of the work performed. Then, too, the division engineer and his assistants make frequent inspection of the project and control the design of the section in the field.

The above procedure has proved remarkably efficient and has reduced the cost of engineering to 1½ to 3 per cent of the total cost of the project.

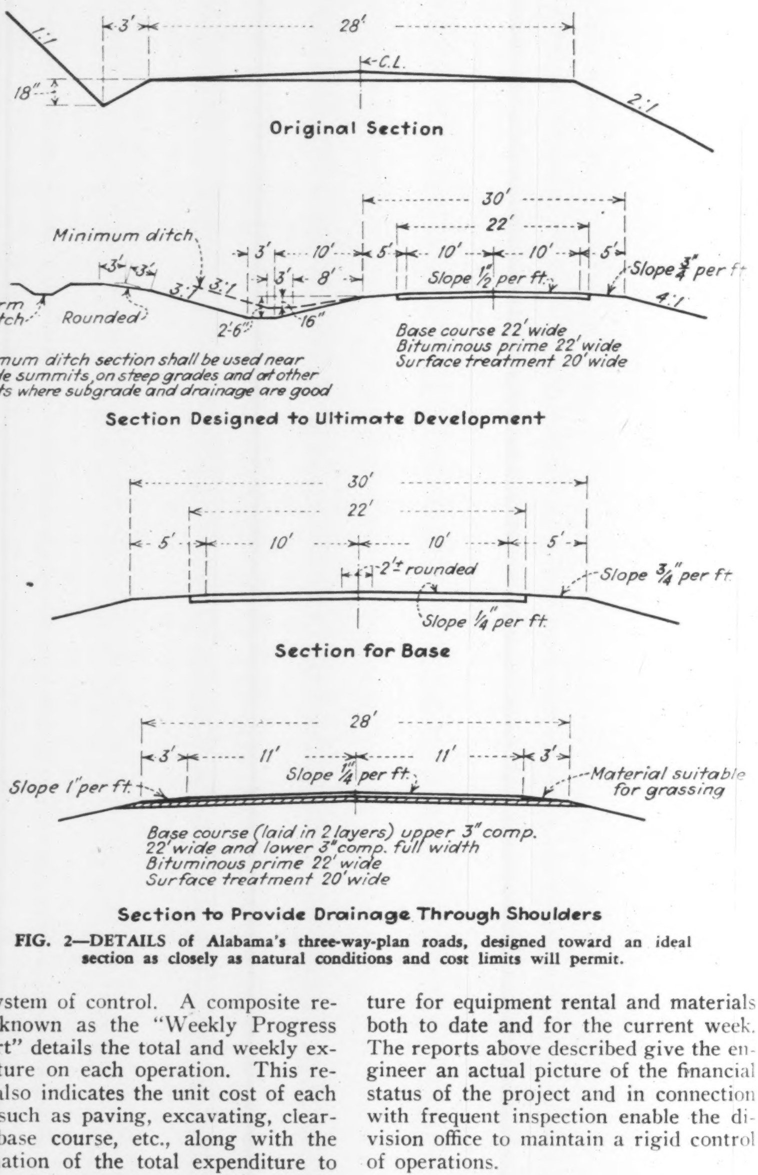
Rent-purchase plan for equipment

Equipment is rented through competitive bids; however, in some instances easily-portable equipment such as motor patrols, tractors and road machines are rented on a rental-purchase agreement to become the property of the three-way plan at completion of payment. This rental-purchase agreement exceeds the rental price by only a small percentage and considerably simplifies the problem of transfer, inasmuch as this equipment may be moved from project to project without regard to county boundaries or without the necessity of readvertising for bids on equipment.

Control of costs

A rigid control of the expenditure on the project is enforced by requiring the superintendent to requisition all equipment, materials and supplies through the division office. These requisitions, approved by the division engineer and the chief engineer, are submitted to the Federal Emergency Relief Administration for purchase through competitive bids. Although the above procedure seems complicated, by exercising a reasonable foresight in presenting requisitions the superintendent may keep his project functioning efficiently.

A few simple weekly reports submitted by the superintendent complete the system of control. A composite report known as the "Weekly Progress Report" details the total and weekly expenditure on each operation. This report also indicates the unit cost of each item such as paving, excavating, clearing, base course, etc., along with the summation of the total expenditure to date and percentage complete of the project. Supplementary reports known as "Equipment Rental Report" and "Material Receipts" state the expenditure for equipment rental and materials both to date and for the current week. The reports above described give the engineer an actual picture of the financial status of the project and in connection with frequent inspection enable the division office to maintain a rigid control of operations.


1:1
3'
28'
C.L.
18"
2:1
30'
22'
Minimum ditch
3'
3'
3'
10'
5'
10'
10'
5'
3'
8'
3:1
3:1
Slope ½" per ft.
Slope ¾" per ft.
4:1
Berm ditch
Rounded
2'6"
16"
Base course 22' wide
Bituminous prime 22' wide
Surface treatment 20' wide
Minimum ditch section shall be used near grade summits, on steep grades and at other points where subgrade and drainage are good
30'
22'
5'
10'
10'
5'
2'± rounded
Slope ¾" per ft.
Slope ¼" per ft.
28'
3'
11'
11'
3'
Slope 1" per ft.
Slope ¼" per ft.
Material suitable for grassing
Base course (laid in 2 layers) upper 3" comp. 22' wide and lower 3" comp. full width
Bituminous prime 22' wide
Surface treatment 20' wide

Original Section

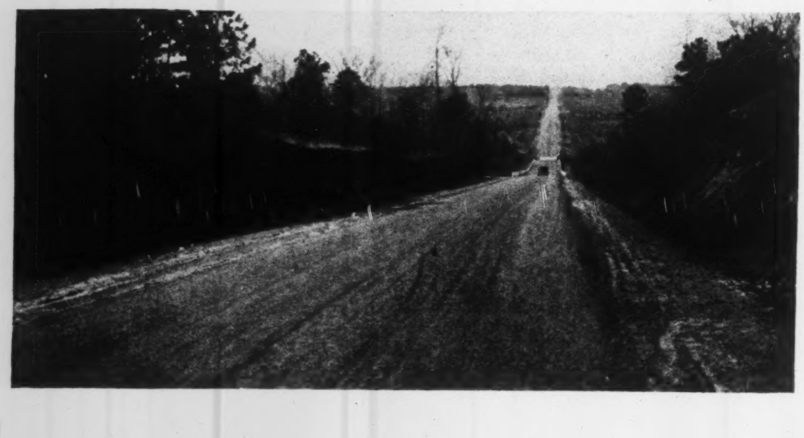
Section Designed to Ultimate Development

Section for Base

Section to Provide Drainage Through Shoulders

FIG. 2—DETAILS of Alabama's three-way-plan roads, designed toward an ideal section as closely as natural conditions and cost limits will permit.

FIG. 3—NARROW DEEP CUTS are widened and given more gentle side slopes to the extent possible within the cost limits.



Grading section flexible

It is impossible to establish design standards for the three-way projects due to the varying conditions encountered over the state; however, a typical section has been adopted and is approached as nearly as finances will permit (Fig. 2). The majority of the three-way plan projects were originally constructed with a 28-ft. roadway, 18-in. depth of ditch, 1-on-2 end slopes, and 1-on-1 back slope. Then, too, on the original construction the vertical curves and grades were constructed to fit the natural ground as closely as feasible with very little attention to sight distances. In view of the undesirability of placing pavement on the poorly developed section described, it is necessary to do considerable redesigning. The back slopes of cuts are excavated for a sufficient distance to allow a 28-ft.

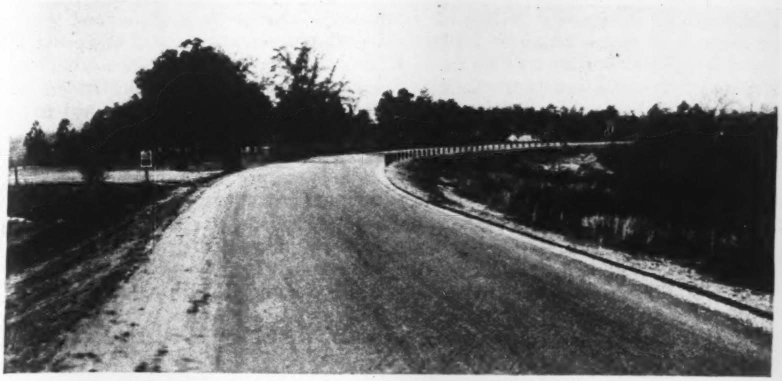


FIG. 4—NO CONSIDERABLE RECTIFICATION of alignment is sought except where actual curve hazard exists; getting miles surfaced is considered the prime objective.

roadway, 1-on-3 end slope, and a ditch 2 ft. deep with a 3-ft. flat bottom, and back slopes of 1 on 2 or flatter, if the height of the cut and width of the right-of-way permit. All excavation resulting from the above operations is used to flatten fill slopes.

In many cases it is impossible to complete the above development within the financial allotment, but in all instances the grading section is as carefully designed as is practicable. No variation is made in the grade except to provide a minimum of 400-ft. sight distance over vertical curves. This policy is dictated by the desire to salvage the surface, compacted over a period of years, for use as a sub-base. It is believed that the invaluable compaction thus salvaged is of more value to the completed pavement than an improved riding surface. However, in some instances where horizontal curves are of such a high degree as to constitute a menace to traffic, new right-of-way is secured and short relocations are constructed.

It is anticipated that it will be possible to improve the grading section to comply with the typical section outlined by the use of maintenance forces released from intensive maintenance through the paving of many miles of highways. To conserve the compact surface of the old road for a sub-base, the road is only lightly scarified and worked to a reasonably uniform section before placing the base course.

Care centered on base course

A compacted 6 in. of local base course material is placed for a width of 22 ft. on the prepared sub-base. Extreme care is exercised in the selection of material, particularly with regard to the clay content and gradation. Experience indicates that base-course material should not contain more than 18 per cent clay as a binder; higher clay content tends to induct water into the base through capillary action resulting in deformation of the surface and failures.

As many of the superintendents are not trained to select suitable base-course material, an inspector and a field laboratory are maintained on the project. The inspector submits to the division office each day an analysis of the base-course material placed. In addition to the above precaution, at the completion of the base-course operations, the inspector analyzes samples taken from the roadway at 500-ft. intervals and submits alternate samples to the state highway laboratory for check analysis. Any material found to be deficient in any of the specified requirements is corrected by the addition of the proper stabilizing medium before placing the pavement.

Immediately after placing, the material is thoroughly scarified, disked, windrowed and harrowed, until it presents a uniform appearance with no evidence of sand pockets. The surface is then carefully brought to the typical section and maintained by continuous blading and watering to the true section for a period of 30 to 60 days under traffic. It has been found advisable to use a typical section providing for ⅓-in. crown per linear-foot to provide efficient drainage of the base course. The crown is extended from edge to center in a straight line with only a 2-ft. vertical curve at the center of the road. Experience indicates that long parabolic curves tend to pool water within the base at the flat point of the curve.

At the expiration of the maintenance period the base course is prepared for priming by hard blading, brooming and blowing with a mechanical blower until all loose material is removed from the surface. Bituminous material for prime is generally tar. In general, TC-2 (viscosity of 13 to 18) is used on chert or clay-gravel bases; TC-3, viscosity of 18 to 25 on sand-clay, and TC-4, viscosity of 25 to 35 on very open bases, is used in extremely hot weather. The rate of application of the tar prime varies from 0.3 to 0.4 gal. per sq.yd., as dictated by the type of base and weather conditions. The prime is ordinarily applied at 125 deg. F. and is permitted to cure for four to seven days until the surface presents a uniform dry appearance. After the prime is completely cured and has been subjected to light traffic for a short period, the surface is ready for paving.

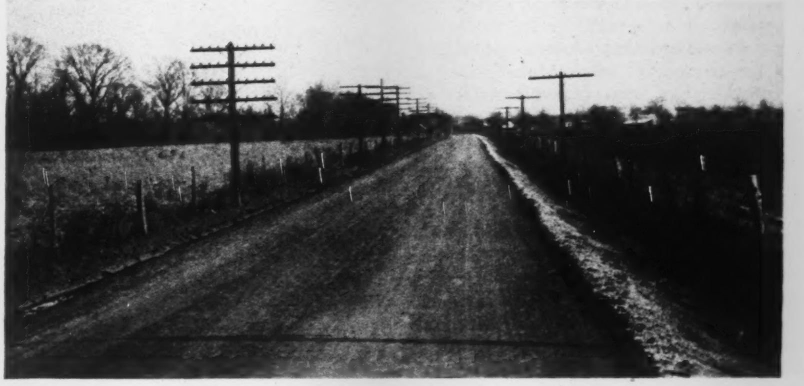
Paving procedure

Bituminous material for second or hot application is ordinarily asphalt, although tar has been quite successfully used. The asphalt is 150 to 200 penetration at 77 deg. F. with the consistency varied between these limits to conform with weather conditions. The material is applied on the prime at the rate of 0.4 gal. per sq.yd., and at a temperature of 275 to 375 deg. F.

Immediately after application the asphalt is uniformly covered with not less than .55 cu.ft. of coarse aggregate per square yard. The coarse aggregates used may consist of broken slag or broken stone having a weight per cubic foot of not less than 75 lb. and a percentage of wear of not more than 15.

Both crushed and round gravel have been used in some instances as coarse aggregate; however, the use of this material may still be considered in the experimental stages, although it has been definitely determined that to be successful the gravel must be graded between the ½-in. and 1-in. screen, as it is very desirable to secure as nearly as practicable a one-size fragment. Experience also indicates that considerably

FIG. 5—ACROSS-ROAD PROFILES made safe by flat slopes even in narrow rights-of-way.



more care must be exercised in the spotting and rolling operations when using gravel as, due to the roundness of the particles, it is more difficult to secure a uniform dense mat.

After the completion of the mat the project is allowed to remain under traffic for 30 days to insure that the mat is properly compacted before sealing. It is generally considered wise after a few days under traffic to remove all surplus aggregates from the roadway to avoid pulverization. It is also general policy to place traffic dividers on the mat during the maintenance period to secure a more uniform degree of compaction.

Sealing presents some unusual features. No effort is made to cover the coarse aggregates with the fine seal aggregates, but instead the gradations of the two aggregates are so designed as to permit the fine aggregate merely to fill the voids in the surface of the mat. This design permits the use of a minimum amount of seal aggregate, 18 lb. per sq.yd. of surface having proved satisfactory. Construction methods are relatively simple, a tack coat of approximately 0.15 gal. per sq.yd. being applied to the surface of the mat after it has been properly cleaned. This tack coat is immediately covered by 18 lb. per sq.yd. of fine aggregate. The aggregate is then covered with 0.25 gal. per sq.yd. of cutback asphalt and thoroughly mixed by use of drag brooms with clapboard attachment. It is imperative that the above operations be conducted in swift sequence to prevent the asphalt from becoming tacky. At the completion of the mixing operation the aggregate is spread to its final position and rolled with a light roller. It is essential that no traffic be permitted on the completed seal for a period of four to seven days, or until the asphalt has thoroughly cured. The above-described seal interlocks with the coarse aggregates and after a few months of traffic presents an appearance and riding surface similar to expensive cold-mixed seals.

A very important feature is constructing shoulders for the full depth of the base of pervious granular material, to permit drainage from the base through the shoulders. If the excavation is not suitable material to provide drainage, it is usually wise to use a special construction design providing for the correction of shoulder material. A section has been found satisfactory that provides for the base-course material being placed in two layers of equal depth, the bottom layer extended over the entire roadway, and the top layer constructed for only a width of 22 ft. with the necessary additional shoulder material being composed of any type of soil suitable to grow grass. The section above described combines the two qualities of permitting drainage through shoulders and providing for a growth of grass to prevent erosion.

Although it is general belief that state-controlled forces cannot operate economically, the unit cost of items of the completed three-way-plan projects is highly gratifying. The difference in wage scales and somewhat different methods and design make it difficult to compare unit cost of construction items of three-way-plan construction with prevailing prices on work conducted under other systems. However, an analysis of the following tabulation of the construction costs of various items of work secured from the cost record of completed three-way-plan projects indictates that the unit costs of these projects are in no way excessive:

Clearing and Grubbing, Per Mile	Shaping Roadway and Dressing, Per Mile	Common Excavation, Per Cu.Yd.
$88	$492.59	.27

Base-Course Material, Per Cu.Yd.	Prime, Per Sq.Yd.	Pavement, Per Sq.Yd.
52.25c.	4.3c.	18.9c.

The real value of the plan is the saving effected by the salvaging of as much as practicable of the present roads. The average cost of the type of pavement described here constructed under former regulations, with the average change in location and including the necessary new drainage structures, has been $14,000 per mile. Assuming that the state invested the $1,250,000 surplus now assigned to the three-way plan in the regular method of construction, even if it were possible to secure federal funds to match this amount, there would only be available $2,500,000, or sufficient funds to pave 180 miles of highway with this investment. However, by using the same sum—namely, $1,250,000—for participation in the three-way plan, there is made available $3,750,000; and on a basis of $6,000 to $7,000 per mile expenditure the state should be able to pave between 500 and 600 miles of highways.

It is true that from an engineering standpoint many of the three-way projects could be criticized with regard to alignment, grading section and sight distances. However, the average citizen who is familiar with Alabama's dusty, muddy, temporary surfaced roads is quite satisfied to accept the lowered standards, to secure the enormous increase in mileage made possible through the simplification of the construction and the development of this unique system of financing.

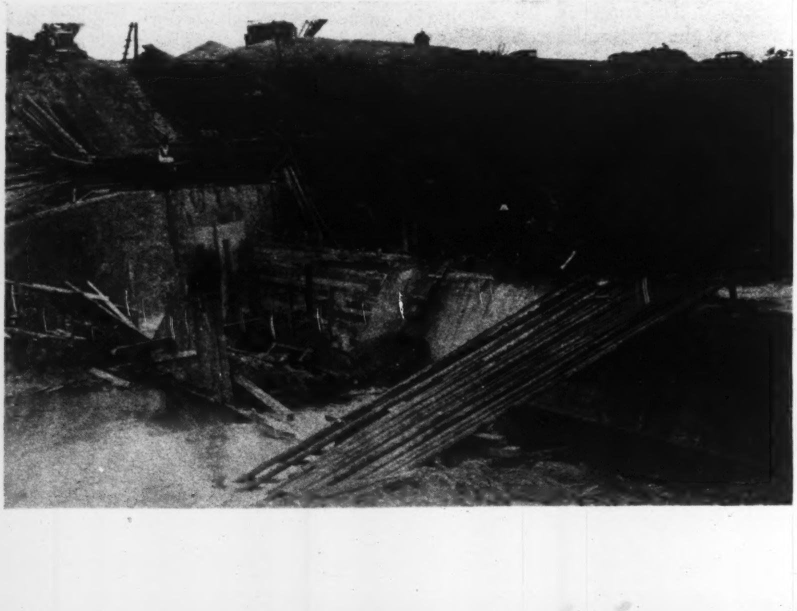
◆

Oil Operators in Building Service Dam Use Pipe Siphons for Bypass

A DOZEN 6-in. pipe siphons made from oil pipe on hand were used instead of pumps to bypass the small dry-weather flow of the Clear Fork of the Brazos River, 15 miles west of Albany, Tex., while oil operators put in the last section of a concrete overflow concrete dam, 13 ft. high and 100 ft. long. Quick-hardening cement was used, and two days after this section was poured a storm sent water several feet deep over the crest but did no damage. The dam impounds water for oil-drilling operations in a near-by oil field and for a small local casing-head refinery.

A 14-in. ledge of Pennsylvania limestone was found 3 ft. below the stream-

FIG. 1—TWELVE 6-in. pipe siphons were used to bypass the flow of Clear Fork while quick-hardening cement was poured in the last section of a small 13-ft. dam.



bed, somewhat eroded but resting on sound shale rock. The base of the dam was set 6 in. into the limestone. The dam was built in short sections. Ends were painted with cutback asphalt and then, by brushing on hot asphalt, an expansion joint of ⅛-in. thickness was built up.

Above the abutments the slopes were paved with hand-laid fieldstone, since floods are likely to fill the whole river flood plane to the top.

The dam cost $20,000 and was built by Roeser and Pendleton, independent oil operators, with sand and rock obtained locally, only lumber for forms and cement being hauled in. John B. Hawley, Fort Worth, Tex., designed the dam and advised during its construction.

Nailed Timber Centering for Concrete-Arch Bridges in Russia

Box units of boards and timbers assembled into arches with three concrete hinges for spans up to 135 ft. carry loads of 8,700 lb. per foot

By E. L. Chlebnikov

Engineer, Government Bridge Trust, Moscow

FOR CONSTRUCTION of concrete-arch bridges in the U.S.S.R., Russian engineers have developed a new type of three-hinged wooden centering consisting principally of pine boards joined with nails. This type of centering was first used in the construction of the large railroad bridge over the Dnieper River at Dniepropetrovsk (*ENR*, Aug. 10, 1933, p. 160) and later in the construction of the highway bridge over the Angara River in Irkutsk, Siberia. The two principal advantages of this type of centering, whose development was dictated by a shortage of structural steel, are economy in use of lumber and simplicity of construction.

The following discussion deals with the design and construction of this type of arch centering as exemplified in the erection of the Angara River bridge whose concrete arches have spans of 262.5 ft. and loaded the centering with 8,700 lb. per linear-foot. A timber crib located at the middle of each of these spans served as a common abutment for two adjoining centering arches, on which falsework was built, to carry the superstructure forms (Fig. 3). In one case the swift current prevented the correct placing of the crib, and three centering frames of unequal spans (137, 121 and 106 ft.) had to be used.

Each unit of centering is a box member 8.2 ft. wide center to center of webs. Its depth at the middle is 9.3 ft. The upper chord consists of wide boards and timbers, the uppermost of which are cut to curve. This construction requires the use of separate short pieces and blocks but considerably simplifies the nailed joints. The lower chord, which is straight, also consists of boards and of one timber. In longitudinal elevation the web of the centering appears latticed in the middle and solid at the hinges (Fig. 1).

The horizontal bracing joining the webs of each box member consists of solid criss-cross sheeting both top and bottom made up of double planking about 1⅝ in. thick, and transverse diaphragms made of timbers and boards.

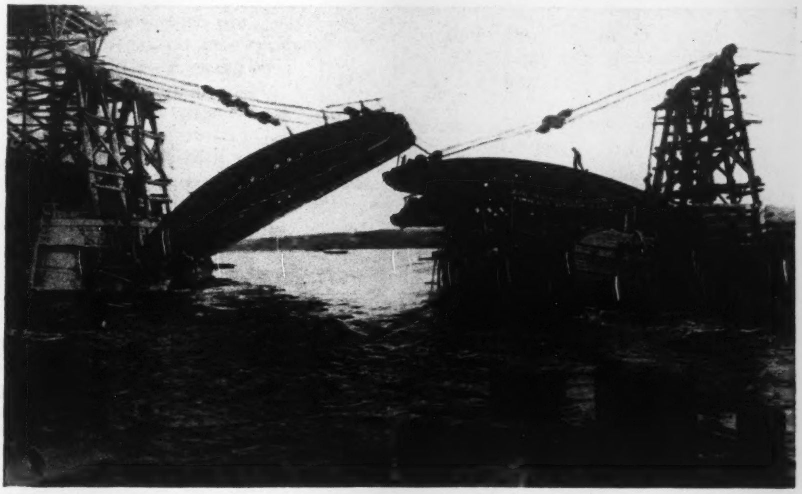


FIG. 1—ERECTING TIMBER CENTERING for Russian bridge. Abutment at right is a temporary crib at the center of the 262-ft. span of the concrete arch.

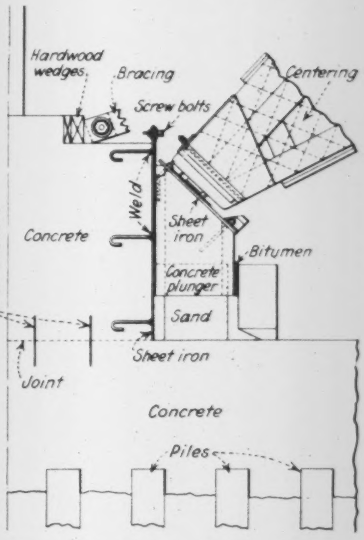


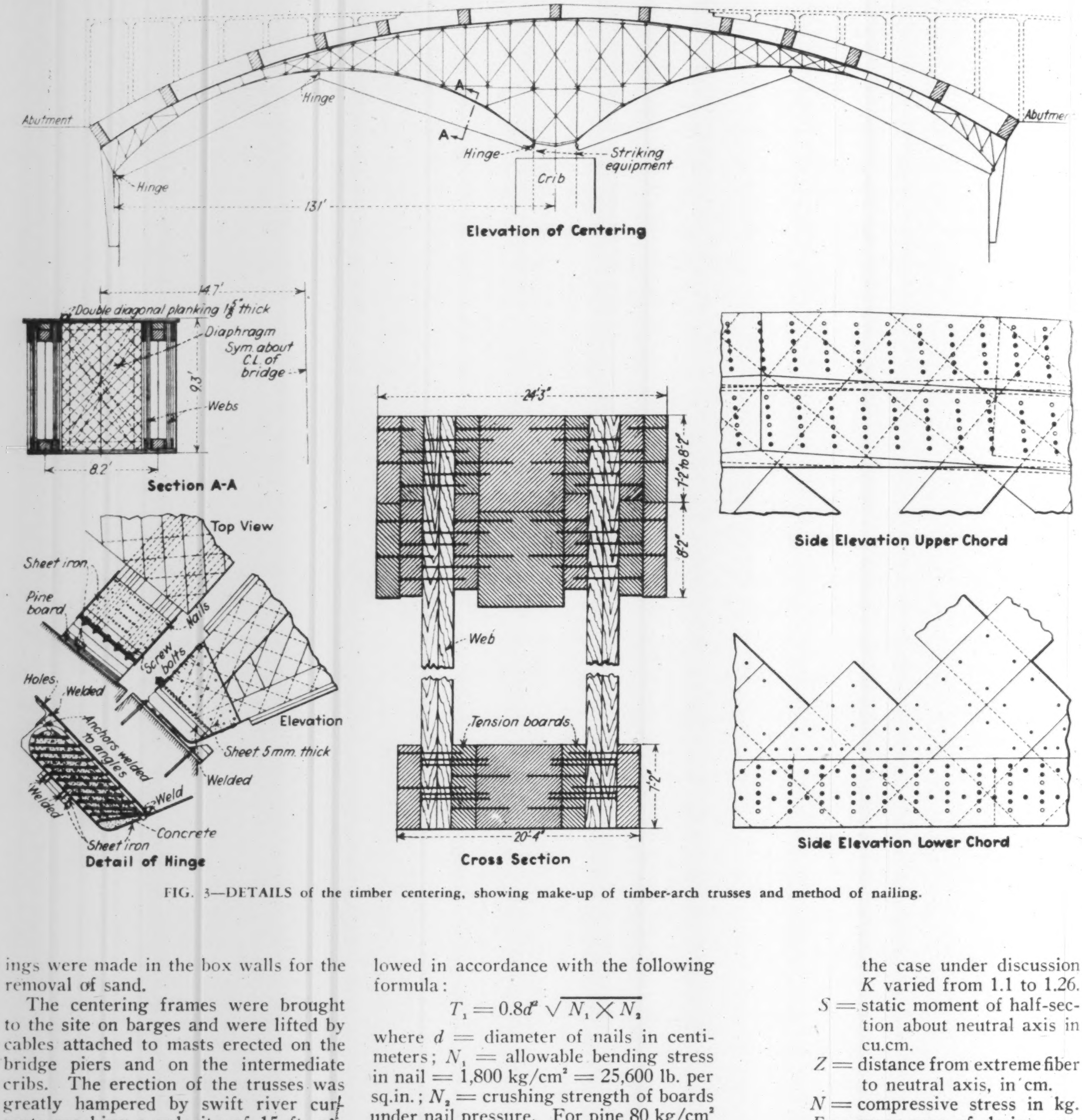
FIG. 2—METHOD of striking centering on crib in center of concrete-arch span.

The simple cross-section of the chords permits the use of horizontal nails only. Assembly of the centering was as follows: first, the timbers of the upper and lower chords were laid on the sheeting, to which the boards and one web were attached; after this, the centering was turned over to its other side, and the remaining boards and web were nailed to it.

Compression in the chords is transmitted through the ends of the planks without special butt-strapping. However, during concreting, when the lower chord was stressed in tension up to 20 tons, only two of its boards carried the tension, the remaining boards and middle timber merely acting as bracing.

The hinges of the arch centering are of reinforced concrete lined with sheet iron (Fig. 3). They are attached to the trusses by nails and sheet-iron straps and serve as a substitute for heavy and expensive steel castings. The bearing sheets of the hinges rest on a bedding of boards, about 1 in. thick, which takes the place of lead sheets usually employed in such cases; preliminary tests and subsequent experience proved their effectiveness up to compressive stresses of 7,000 lb. per sq.in.

Equipment for striking the arch centering was placed on the crib and consisted of reinforced-concrete plunger blocks, of rectangular cross-section, resting on reinforced-concrete boxes filled with sand. The horizontal thrust of the centering was transmitted to a concrete block connected with the top slab of the crib. To reduce friction in lowering the plunger block, greased sheet-iron linings were used. The plunger carried a bearing plate at its upper end. Three rectangular open-



Elevation of Centering

Section A-A

Detail of Hinge

Cross Section

Side Elevation Upper Chord

Side Elevation Lower Chord

Abutment
Hinge
A
A
Hinge
Striking equipment
Crib
Hinge
131'
Abutment
14.7'
Double diagonal planking 1 5/8" thick
Diaphragm
Sym. about C.L. of bridge
9.3'
Webs
8.2'
Top View
Sheet iron
Pine board
Nails
Screw bolts
Holes
Welded
Anchors welded to angles
Elevation
Sheet 5mm. thick
Welded
Weld
Welded
Concrete
Sheet iron
24'3"
7'2" to 8'2"
8'2"
Web
Tension boards
7'2"
20'-4"

FIG. 3—DETAILS of the timber centering, showing make-up of timber-arch trusses and method of nailing.

ings were made in the box walls for the removal of sand.

The centering frames were brought to the site on barges and were lifted by cables attached to masts erected on the bridge piers and on the intermediate cribs. The erection of the trusses was greatly hampered by swift river currents reaching a velocity of 15 ft. per second.

The materials required for the construction of one centering assembly of 120-ft. span, 8.3 ft. wide, were as follows: lumber, 39,000 ft.bm.; nails, 3,483 lb.; and screws, 550 lb.

Principles of design

As a rule, the nails used were from 3 to 7 in. long and from $\frac{3}{32}$ to $\frac{1}{4}$ in. in diameter. To avoid splitting, the boards were required to be of a thickness not less than four times the diameter of the nails used. Nails were spaced 20 diameters apart along the wood fiber and 4 diameters apart across the grain.

Working stresses in the nails were allowed in accordance with the following formula:

$$T_1 = 0.8d^2 \sqrt{N_1 \times N_2}$$

where d = diameter of nails in centimeters; N_1 = allowable bending stress in nail = 1,800 kg/cm² = 25,600 lb. per sq.in.; N_2 = crushing strength of boards under nail pressure. For pine 80 kg/cm² (1,138 lb. per sq.in.); and for oak 110 kg/cm² (15,650 lb. per sq.in.)

Stresses in the chords and in the web struts were determined by usual methods, taking into account wind pressure and longitudinal buckling.

For the determination of shearing stresses due to longitudinal buckling in a vertical plane, the following formula was used:

$$T_0 = \frac{K}{L/2} \frac{SN_3}{ZN_4} \left(\frac{1}{\alpha} - 1\right) \frac{N}{F}$$

where: T_0 = shearing stress per linear meter of arch.

K = empirical coefficient depending on number of boards in a section. In the case under discussion K varied from 1.1 to 1.26.

S = static moment of half-section about neutral axis in cu.cm.

Z = distance from extreme fiber to neutral axis, in cm.

N = compressive stress in kg.

F = gross area of design section, in sq.cm.

L = length of arch along curve in meters.

α = coefficient of longitudinal buckling.

N_3 = allowable bending stress, 150 kg/cm² (2,134 lb. per sq.in.).

N_4 = allowable compressive stress, 135 kg/cm² (1,920 lb. per sq.in.).

The design of the fastening of the vertical webs to the chords was checked in two ways: for the displacement of the entire web along the chord and for the pulling out of individual diagonals. The latter factor governed in the design of the latticed part of the web of the truss.

Current Notes on Sewage Disposal

An analytical summary of recent developments for the engineer, research worker and plant operator

CHEMICAL COAGULATION

Some interesting tests relative to chemical coagulation have recently been published by Damoose (*Mun. Sanit.* 7, January, 1936) giving the results obtained from a pilot plant installation operated over a period of six months at Grand Rapids, Mich. The application of chemicals varied in dosage from 9 to 35 p.p.m. If the results have not definitely established the superiority of ferric chloride over ferric sulphate and alum, they show at least that the latter two coagulants are not superior for coagulating the Grand Rapids sewage. Gas production at the treatment works during a three-year operating period averaged 5.88 cu.ft. per pound of raw sludge retained, while with 220 p.p.m. ferric chloride the calculated increase in the daily gas was 47.4 per cent. Recommendations are made to apply chemicals during 16 hours for 184 days, with an increase in cost of $2.77 per million gallons.

The advantages of adding chemicals to the primary tanks at Grand Rapids were chiefly: increased removal of solids and decreased chlorine demand, and an increase in B.O.D. reduction which ranged from 40 to 58 per cent.

* * *

PICKLING LIQUOR INCREASES TRICKLING-FILTER EFFICIENCY

The beneficial effect of pickling liquors on sewage clarification is in general well recognized. In connection with partial chemical precipitation to reduce the load on trickling filters and at places where complete chemical precipitation is practiced, experimental results obtained by Hurley (*Proc.*, Institute Sewage Purification, 1935, 164) on sewage containing large quantities of wool scouring and gas-house liquor wastes, are of interest. Adding pickling liquor to the effluent of sedimentation tanks before application to trickling filters showed that nitrification was increased, a clearer liquid was obtained, and no clogging occurred during three months' operation; only slightly greater oxygen demand reduction took place. It may be expected, therefore, that when chemical precipitation methods are applied to sewage containing pickling liquors better results with smaller quantities of chemicals will result.

REGENERATION OF ACTIVATED SLUDGE

Coste (*Surveyor*, Jan. 17, 1936) reports results on a 10-m.g.d. experimental activated-sludge plant, where the effluent from the preliminary settling tank is discharged into a weir chamber, which communicates with the aeration units by means of an open channel. A novel feature is that the aeration channels are in two compartments, one above the other, circulation being effected by paddles. The quantity of air used was between 0.5 and 0.6 cu.ft. per imperial gallon, this amount being used almost entirely for re-aeration. The purification is not carried to the nitrofication stage, and the author thinks that this procedure may have prevented bulking of the sludge.

The method of effective re-aeration is considered to have caused much of the organic matter to be removed by oxidation and changed to carbon-dioxide and water during the clarification stage, leaving only relatively small quantities of suspended matter (45 p.p.m.) in the effluent. The method of operation, by placing emphasis on the re-aeration and intensive regeneration of sludge, results in extensive clarification without producing a fully purified, stable effluent. The results came close to those obtained by modern effective chemical precipitation and further developments hold great promise.

* * *

CANNERY WASTE TREATMENT

Seasonal loads of organic wastes produced in the canning industry present a difficult problem when this material mixed with normal sewage reaches the treatment plant. The problem cannot be avoided by prohibiting dumping of such wastes into city sewers but should be accepted as a challenge to further research. Experiments made by treating cannery waste in activated-sludge plants reported by Warrick and Beatty (*Sewage Works Journal*, January, 1936) seem to indicate that proper pretreatment or additional aeration may be a distinct advantage to prevent troubles. Modification or removal of detrimental substances from pea and corn cannery wastes after preliminary screening and then mixing with domestic sewage may be the way out to produce a good effluent, prevent or decrease bulking and avoid other operation difficulties.

WEED SEEDS IN SLUDGE

The familiar sight of numerous tomato plants growing on sludge piles around sewage-treatment works frequently elicits the question how long tomato and weed seeds can withstand the digestion processes. The question of resistance of weed seeds is of particular interest to those who sell partly or completely digested sludge for fertilizer to farmers, or for lawn dressings. An interesting study to determine the resistance to anaerobic digestion of the more common weed seeds present in raw sludge is described by Viehl (*Gesundheits Ingenieur*, Jan. 18, 1936) in which it is shown that after ten weeks' digestion practically all weed seeds failed to germinate. After the same time of digestion, tomato seeds germinated and grew practically the same number of plants as those not subjected to the digestion processes. After 17 weeks' retention 60 per cent of the tomato seeds failed to germinate.

* * *

METHODS OF AERATION

The cost of operation and the efficiency of an activated sludge plant is materially influenced by the quantity of air diffused based on the power input necessary. There are not many published results to show which manner of aeration is best for a given sewage. Comparative results obtained when different methods of keeping the sludge mixtures in suspension are employed to produce equal purification with the same sewage are of particular interest. Hodgson (*Trans.*, Institution Engineers, Australia v. 16, p. 229, 1935) found when experimenting on a plant scale with different systems of aeration, when one unit was run with air alone and another with a combination of paddles and air (choosing the quantity of air so as to make the power input equal in each unit), that the latter method gave a much higher dissolved oxygen content, thus indicating its greater efficiency. A similar experiment carried out with paddles locked in position, the paddle blades thus acting as a baffle to the air, proved this to be superior to air agitation alone, but not nearly as efficient as the combination of air and rotating paddles against the current. Operating paddles in the same direction with air proved very uneconomical because as much air was required as without paddles.

Mopping Up After The New England Floods

Cities in the Connecticut and Merrimack valleys scrape the debris from their sidewalks and buildings, clean filterbeds and sewer lines, rehabilitate homes, plan bridges and street replacements and repair dikes and walls that can never again be regarded as sufficient flood protection

By E. J. Cleary
Assistant Editor, Engineering News-Record

A PERSONAL SURVEY of the flood devastated regions of New England reveals not only the vast amount of damage to public and private property, but also brings to light the able manner in which municipal engineers and other public officials met the unprecedented emergency that suddenly confronted them in the latter part of March. Had it not been for their rapid and intelligent mobilization of defense and subsequent organization for rehabilitation, the loss of life and property would have been enormously multiplied.

In almost every town and city visited, the story of preparedness began when the municipal engineer, anxiously watching an ice-choked and rain-swollen river, noted a slow but continuous rise in his river gage graph. When flood stages were reached and the curve kept going upward, with reports from upstream that no crest had been reached, he jumped into action. Proper authorities were informed of the impending danger and persons were ordered to evacuate those areas where flooding was anticipated; actual removal, however, was accomplished with difficulty, for either the people scoffed at the idea or else they became panic stricken.

Next came the job of organizing squads of dike builders and furnishing them with equipment and materials to construct temporary structures at vital spots. Bridges also demanded attention, and many of them were loaded with paving blocks and other heavy materials.

These tasks were hardly started when the rivers forced entry into the city either by overtopping of banks or by backing up into the sewer systems. It was then only a short time before essential services were rendered inoperative—electric light and power plants failed, water supply systems were crippled and eventually all communication devices were paralyzed.

To meet the emergency legions of loyal workers banded together by the Red Cross, WPA, CCC, Coast Guard, Militia, and numerous other agencies struggled to bring order from chaos. The homeless were housed and fed in school buildings, portable electric generators were installed or power was brought from outside sources, water supplies were partly restored and telephone service resumed.

When the waters receded, leaving a blanket of silt, snow plows and road scrapers opened up the streets which were later cleaned by shovel gangs. Health authorities placarded as unfit for habitation every building that had been flooded; they also destroyed all foodstuffs that were submerged. Cellars were pumped out and buildings examined for structural and sanitary hazards; as soon as defects were remedied, the homes were cleaned and disinfected. The occupants were not permitted to return until they had been inoculated for typhoid.

In this fashion the rehabilitation is being carried on. Reconstruction, however, has only begun. Streets and sidewalks in many places are damaged beyond immediate repair and it is yet too early to determine what has happened to sewer systems. Bridge repairs and replacements will require months for completion.

The municipal engineer who acquitted himself so well in the flood emergency now faces the important problem of planning the restoration of his community. The immediate outlook is regarded as dismal unless federal aid is forthcoming. The present rapid temporary recovery would have been severely curtailed were it not for the hundreds of workers from both the WPA and CCC who are now engaged in the task of clean-up and repair.

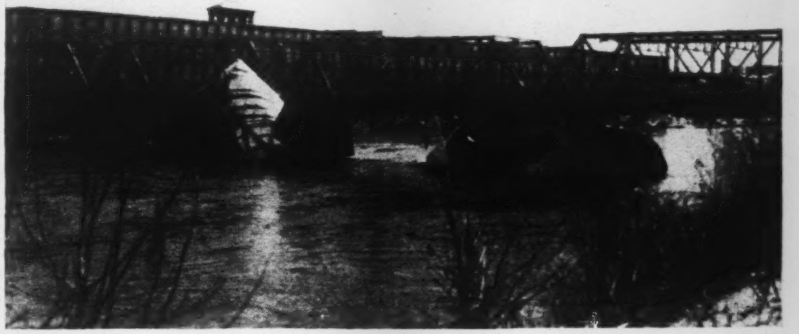
The question naturally arises as to what measures will be taken to avoid a repetition of this flood disaster. In the Merrimack and Connecticut River valleys, the most severely damaged regions, general opinion indicates that local control works will be too expensive and of little value. It is thought that the solution to the problem lies in the construction of retention reservoirs near the headwaters of major rivers and along important tributaries. This would necessitate interstate cooperation, and present prospects toward that end are not particularly favorable.

Blue denim bags for dikes

By means of half hourly telephone reports from up-river points, city engineer Stephen Kearney of Lowell, Mass., followed the rise of the Merrimack and when flood stage was reached, he had already organized a plan of defense.

The 12 men of his permanent engineering staff reinforced by a group of WPA supervisors comprised the lieutenants who guided the activity of hundreds of men in throwing up sandbag dikes at predetermined vital points. But this was no ordinary flood and as workers struggled to keep the dikes higher than the advancing water, the supply of bags diminished rapidly. It was then that the services of a women's WPA sewing project were utilized. Rolls of blue denim, originally destined to be made into overalls, were cut and fashioned into bags by scores of women toiling feverishly all the night. More than 100,000 such bags were used for diking.

SYMBOL of an engineer's foresight. Francis' Gate built in 1848, was dropped for the first time in 84 years to save the city of Lowell, Mass., from severe damage.



AT MANCHESTER, N. H., the Granite St. Bridge withstood the ouslaught of two large oil tanks.

The rising waters could not be curbed and as they advanced to a point 7½ ft. above the previous high water in 1852, more than 4 square miles out of a total of 14 square miles in the city were inundated. Preliminary estimates place the damage to public works in Lowell at $2,700,000, or about five times as much as the rest of Middlesex County combined.

Francis' Folly

While enormous losses were suffered, a major catastrophe that would have destroyed the business section of the city was avoided through the foresight of an engineer almost a hundred years ago. The Merrimack River makes a right angle turn in Lowell and years ago a power and navigation canal was built between the arms of this triangle through the center of the town by the Locks & Canal Co. of Massachusetts. James B. Francis, then chief engineer of the company, recommended that a gate be built near the upstream end of the canal, to prevent flood waters from entering the city through the artificial waterway. He was ridiculed by everyone, but despite popular opinion and the strenuous objections of the directors of the company, he carried his point and in 1848 built the gate which was immediately christened Francis' Folly by the townspeople.

This gate, about 29 ft. long, 25 ft. high, and 20 in. thick, is suspended by a loop of 5x1¼-in. strap iron from a framework of huge hand-hewn timbers. It slides in two grooves built into heavy masonry walls on either side of the canal. Four years after it was built, in the flood of 1852, it was used for the first time but since then it has hung in place as a historic curiosity.

On the night of March 19, 1936, Arthur T. Safford, present chief engineer of the Locks & Canal Co., keeping a vigil with the city engineer, became convinced that despite the already dangerously high stage of the river it would go still higher before reaching a crest. It was then he ordered that the canal gate be dropped.

Two men armed with cold chisels and hammers climbed to the top of the heavy wooden frame and crawled out to the iron band loop. As they chipped away, other workers threw up a sand bag dike on each side of and at right angles to the canal. When the iron band finally parted, the old wooden gate that had not been moved in 84 years slipped gently into place. Today the people of Lowell are of the unanimous opinion that no longer will this landmark be called Francis' Folly.

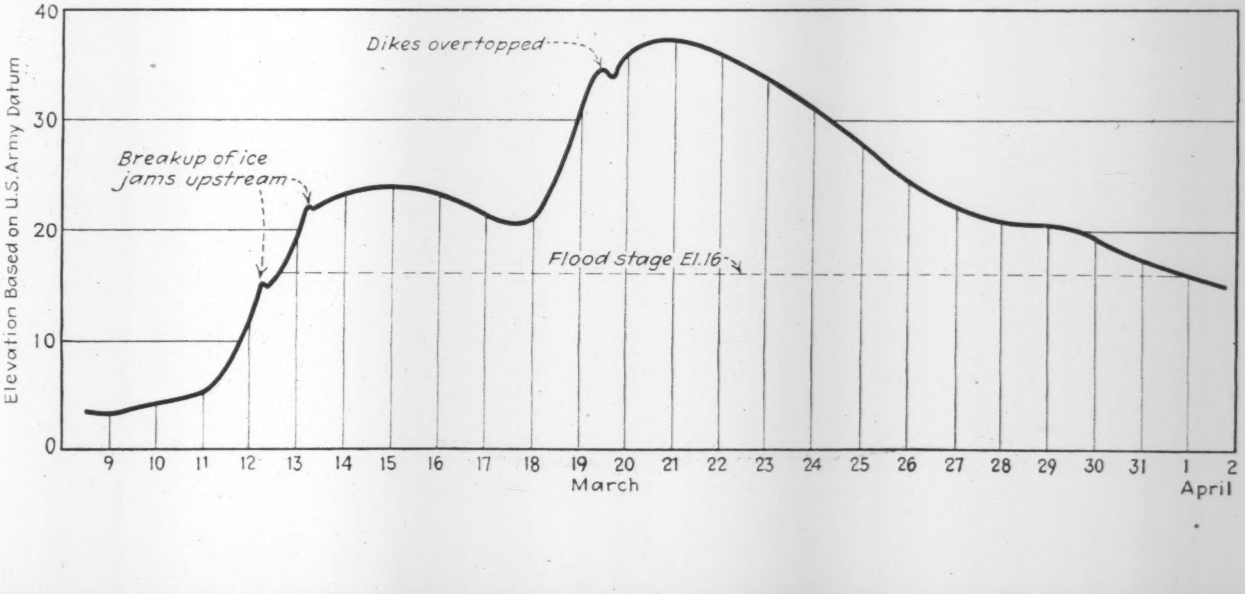
Rehabilitation program

Lowell is depending largely on WPA funds in its task of rehabilitation. About 2,000 men have been put to work. Road scrapers and grading machines were first used in clearing to one side the 2 ft. layer of mud that covered the streets, and the piles were then removed by trucks. About 124 trucks have been engaged in this work and in carrying away other debris. Storm sewer catch basins are choked with silt and they too are being cleaned.

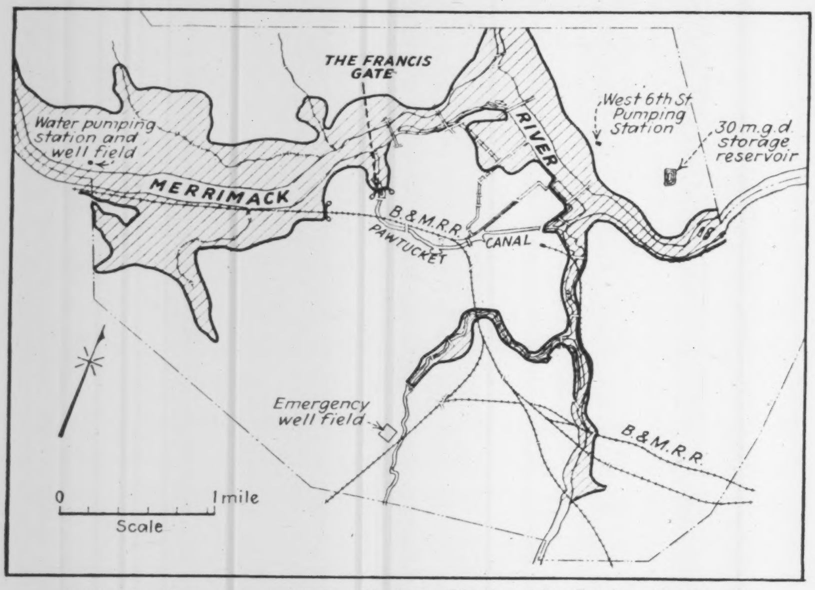
One of the biggest jobs is the examination and rehabilitation of some 853 homes from which more than 2,100 people were taken. The procedure in carrying out this work is as follows: After the street department has cleaned a thoroughfare and pumped out cellars, the building inspectors make an examination for structural, gas and electrical-wiring defects and this is followed by a health department survey. If everything is in order the occupants of the house are inoculated for typhoid immunization and then sent to the Red Cross headquarters where an approval card granting permission to enter the premises is on file. Food and essential house furnishings are supplied to the unfortunate flood victims.

A complete estimate of loss has not been attempted because much of the damage to the streets and sewers will not make itself apparent until several weeks have elapsed. Tentative figures indicate that repairs to streets, sidewalks, sewers, water mains, parks and buildings will be approximately $1,000,000; bridges, pipelines and retaining walls will cost about $1,700,000.

THE RISE AND FALL of the Connecticut River at Hartford. Two flood crests occurred within a week of each other but the first did no damage.



DIGGING OUT a city street after the flood. Tractor plows made the initial cut and shovel crews with trucks did the rest.



THE AREA that was flooded in Lowell, Mass. The Pawtucket Canal passing through the heart of the business section would have given access to the Merrimack River had it not been for the Francis' Gate.

STREET DEPARTMENT workers of Springfield, Mass., lost no time in making repairs to badly damaged thoroughfares.

Bridges endangered in Manchester

Damages estimated at $5,000,000 and 3,900 homeless was the toll of the Merrimack River at Manchester, N. H. when it rose 17.4 ft. above the Amoskeag Dam, 8.4 ft. above the previous record.

The west section of the city, with a population of 35,000, was badly inundated and isolated for hours when the bridges were ordered closed. This precaution undoubtedly saved many lives because the McGregor St. steel truss was washed away and the Granite St. bridge, principal means of access to the west side, was battered by two huge oil tanks that lodged against the superstructure and damaged uprights and chord members.

Textile and other industries located along the river banks suffered the greatest losses when they were submerged above the second story. Preliminary estimates of public works damage were as follows: bridges, $665,000; culverts, $89,000, and sewers, $38,000.

City employees already engaged in many unusual tasks assumed the role of animal trainers when they rescued a bear that floated away from the submerged Manchester zoo on a piece of ice. The ice became lodged in an alleyway and it was not until two days later that the bear was discovered. After being lassoed, it was led to safety through a second story window.

Lawrence water supply flooded

At Lawrence, Mass., the river reached a height of 10 ft. above the previous high mark established in 1896, and 1.2 sq.mi. of the total area of 6.75 sq.mi. was inundated. The greatest damage was caused by water backing into sewers and thus finding entry into cellars and other low places.

A critical situation developed when the slow sand water filters, located on the river bank, were flooded. The pumping plant was also flooded and only 40,000,000 gal. of potable water was in storage; the daily consumption is 5½ million gallons. Emergency connections with nearby towns were made by means of hose lines, and fire department pumpers maintained pressure. It is expected that it will be several weeks before all the filters can be cleaned of silt and put back into operation.

Electric power and telephone service were out for one day and the gas works was unable to operate for three days.

Robert W. Priestman, city engineer of Lawrence, stated that while public works damage was small in comparison with that suffered by other communities along the Merrimack, the damage to private property was very high. Street opening and repairs are being carried on with a $12,000 WPA appropriation.

Haverhill engineers use radio

More than one-twelfth of the city of Haverhill on the Merrimack was under water when the river reached a stage of 8 ft .above the previous highest record made in 1887. Although telephone communication and other signal systems were destroyed, L. C. Lawton, city engineer, maintained contact with his emergency crews by means of a temporary short-wave radio installation set up in the town hall.

The central fire headquarters was under 6 ft. of water, and not only were important pieces of equipment marooned but the alarm system was completely deranged. A temporary system was quickly installed and fire-fighting apparatus from nearby towns was stationed on higher ground ready for action.

As the waters receded, tractors with scraper attachments went through the streets and plowed to one side the silt which in some places reached a depth of 2½ ft. Later a force of 800 WPA workers with 60 trucks gathered up the mounds of mud. It is estimated that a month will be required to complete this job and to clean out clogged catch basins and sewers. The total damage to the latter could not be estimated as yet but street and sidewalk reconstruction will cost about $80,000. A steel bridge was carried away but no estimates were available on the cost of its replacement.

The health department at Haverhill, as in other Merrimack Valley cities, ordered the destruction of all foodstuffs including canned and bottled goods that had been submerged. Residences that had been submerged were declared unfit for occupancy until foundation and other structural features were declared safe and sanitary squads had removed all health menaces.

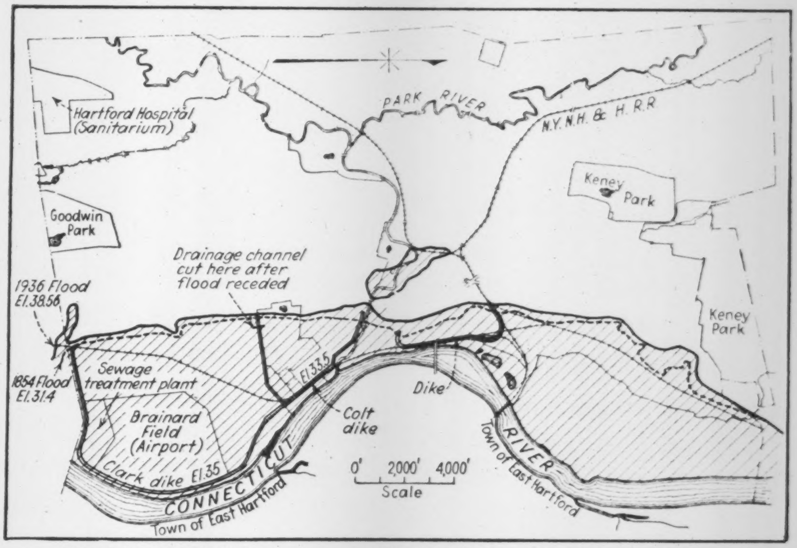
The dikes at Hartford

Undoubtedly the worst flood-ravaged community in New England was Hartford, Conn., where more than 25 per cent of the city was inundated, in some places to a depth of 30 ft., when the Connecticut River swept over dikes that were built above any previous high water level.

The first flood dike in Hartford was built by Colonel Colt, the firearms manufacturer, whose factory was unundated in 1854 when the Connecticut River reached an elevation of 31.4, a figure surpassed only by the 1936 flood which reached El. 38.6 (city datum). To protect his property against future water invasion, Colt encircled a large area of lowland with an earth wall carried to El. 33.5. In the 75-year period of its existence it served successfully to keep out every freshet.

In 1930 the city extended its flood protection work to include all the area within its limits lying south of the Colt dike by constructing a 3-mile long dike 50 ft. wide on top and 25 ft. above the meadows along the river. This structure, flanked with riprap protection, was carried to El. 35. Behind it was lo-

PREPARING TO CUT A CHANNEL through the Colt Dike in order to release the water trapped in the "protected" area when the Connecticut River receded. A temporary water supply main is shown on the left.



DIKES IN HARTFORD were overtopped for the first time and the Connecticut River inundated 25 per cent of the city. The Park River permitted backwater to enter and flood the business district.

BEHIND THE COLT DIKE in Hartford streets were gutted and underground utilities demolished.

cated the municipal airport and numerous industrial establishments, including two big gasoline storage plants. The new sewage treatment works, partly completed, is also located in this area.

When the river passed all previous records and continued in its unabated rise toward the crest of the dikes, city engineer Roscoe N. Clark dispatched emergency workers to raise the dikes by means of a timber core wall surrounded by earth fill. At the same time he warned police and other organizations to move out all people living behind the dikes. Shortly after this had been done the rising water swirled over the dike, breaching it in one place for about 1,000 ft. Streets were torn out to depths of 12 ft.; wooden buildings were smashed and carried away; scores of large steel oil tanks were turned over and the entire basin was covered with a 2-in. layer of gasoline, creating a serious fire hazard. One tank in floating away passed over the sewage treatment plant, shearing off half of the brick screen house.

The Park River, a small stream passing through the business center of Hartford and tributary of the Connecticut, gave access to backwater which flooded and paralyzed a portion of the city, putting the power distribution and telephone lines out of commission. The city water supply, derived from an upland source, remained in operation, however. Caleb Mills Saville, chief engineer of the Metropolitan Water District, reported that while no serious breaks occurred in any of the mains, the destruction of sprinkler system installations in factories caused water consumption to increase from 18 to 30 m.g.d.

Sewage pumping stations along the river front were rendered inoperative by flooding or by lack of power, and four large steam pumps were rushed from New London and temporarily used.

After the river had fallen, there was still some 30 ft. of water behind the dikes that could be released only by cutting a channel through the dike wall. Since a roadway on the dike was the only means of access to the area, it was necessary to construct a temporary bridge over the proposed channel; under the direction of J. F. Ross, assistant city engineer, a timber bridge 12 ft. wide and 40 ft. long, capable of carrying 20 tons, was constructed in one day and two nights. Before the bridge was decked, a channel lined with sheet piling was excavated under the bridge. A sheet pile weir was placed at the downstream end of the channel to prevent erosion of the budge abutment and this weir was driven down as the waters were lowered. Despite these precautions, considerable undermining at the toe of the weir did occur.

Sanitary and building inspection

When it became possible to enter the flooded area, the health department placarded all houses as unfit for habitation. Following this the city employees pumped out all cellars. Then the building department, headed by W. J. Ennis who had mobilized a group of 200 building mechanics, sent out squads of men to examine all homes for structural, plumbing, heating and electrical defects. To eliminate any fire hazard when power was restored, the electrical switch in every house was disconnected; aiding in this special work were 18 electricians sent from the U. S. Naval Station at New London.

All building reports were entered on a master card system, and tax maps were marked with appropriate pins indicating the status of each building inspected. When a house was fully approved structurally, the health department then sent a squad of men to remove all debris and wash out the mud. The dwelling was then sprayed with a solution made up of 1 lb. of chloride of lime to 6 gal. of water; creosote solution was also used in some cases. It is estimated that 2,019 homes will require this treatment before they can be restored to use. No one can occupy a rehabilitated home until he has be inoculated for typhoid.

Sewers lead water into Springfield

The flooded Connecticut River e tered the city of Springfield by tw routes: The north section is surround by a dike that was overtopped, and t central and southern parts of the cit which slope down from a high riv bank, were submerged by water th entered through the sewer system.

The dike was constructed the ye after the disastrous 1927 flood and ru from the North End bridge for tw miles to the village of Chicopee. B hind its apparent protection more tha 1,800 families had built homes. On th afternoon of March 19, Cornelius Phillips, city engineer, became convinced from up-river reports that the dike would be overtopped in a few hours, and he advised the police and other city departments to order evacuation of the danger zone. Waiting until 6 p.m. until the heads of families and school children would all be at home, a radio warning was broadcasted that everyone must move out. Meantime 40 trucks from the department of public works had been dispatched to the territory and in $3\frac{1}{2}$ hours every place had been vacated and the area was under police guard. Four hours later the river came over the dike and destroyed a vast amount of private property but no lives were lost.

An interesting sidelight to this episode occurred in the operation of two sewage pumping stations in this low lying region. Just before the dike was overtopped the 30-ft. head of water against the discharge pipe in the river proved to be too much pressure for the motors and the direction of the pumps was reversed. Destruction was prevented by closing down the discharge valves. When the river receded, this equipment with its independent power supply went back into service immediately and unwatered the area.

The central and southern parts of the city include the business district, and when they were flooded by back water

HIGH WATER at Washington Square in Haverhill receded to leave a 12-in. layer of mud.

oming in through the sewers almost ll the essential services were suspended. lectric power and light were off for a week, but the water supply coming from an upland source remained in ervice and no mains were broken. Telephone communication was discontinued until portable gasoline driven generators could be rushed to the city and set up outside the exchange building.

More than 6 sq.mi. of the 34 sq.mi. comprising Springfield were under water.

Emergency rehabilitation headquarters were set up in the city's central storeroom building, and light was obtained from an electric generator operated with power obtained from a diesel tractor engine. The city council appropriated $100,000 and immediately put to work some 600 men on its payroll.

Streets were opened with snowplows and after the debris had been carried away by trucks, the sidewalks and pavements were flushed clean with water. About 300 pumps of all sizes and descriptions were used in unwatering cellars.

* * *

An account of rehabilitation measures in the flooded areas of Pennsylvania and West Virginia will be published in next week's issue.

Safeguarding Water Supplies In Flooded Massachusetts

WHEN THE FLOODS of March 18-25 inundated many of the thickly-populated sections of Massachusetts the state sanitary engineering forces and municipal water department employees in the affected regions, were presented with an unprecedented emergency. How they maintained vital supplies of disease-free water, in many cases under the most difficult circumstances, is a story of organization, foresight, technical ability and plain hard work.

Health department organization

Forewarned by experiences in the 1927 flood and by high waters occurring a week previous to March 18, the state sanitary engineering organization under the direction of Arthur D. Weston, chief engineer of the Massachusetts state department of health, was held in readiness. When the rivers started to rise these engineers were immediately dispatched to various places in the state where it appeared likely that trouble might develop.

Decentralization of organization in the field was considered the first essential for successful emergency work because communication channels are usually disrupted and local situations develop so quickly that direction from a central focal point is virtually impossible. Each field engineer was qualified through training and experience to act alone as his judgment dictated. Thus, all areas in the flooded zones were quickly placed under the immediate supervision of a competent sanitary advisor who constantly checked the quality of water, was ready to apply emergency chlorination measures and could be depended upon for such aid as the occasion demanded. This assignment was most exacting and required men with a determined sense of responsibility; it is not unusual to note on departmental records where some of the engineers were on continuous duty for as long as 70 hours.

A general warning was broadcast by radio, to boil all water but as soon as the fieldmen had checked their areas and made an initial report this warning was restricted to those localities that were actually in the danger zone. A teletype transmitter and receiver, connected with similar state-wide police facilities, was installed in the Boston offices of the health department, and in this manner a central information clearinghouse was conveniently established. When it became evident that the flood zone would be confined to the Connecticut and Merrimack valleys additional engineers were concentrated in those regions.

Along the Connecticut River, the supplies for Springfield, Holyoke, Northampton, Greenfield, and in fact, most of towns in this region, are obtained from upland sources above flood level. This meant that contamination could arise only from the watershed itself or from broken mains. Since the watersheds were in general free from pollution and there were few breaks in pipe mains, little difficulty was experienced.

Merrimack Valley supplies endangered

In the Merrimack Valley, however, the situation was far different. Many of the public water supply works, particularly those of Lowell and Newburyport, are close to the river while the Lawrence supply is taken directly from the river and filtered in a low-level plant.

Before any difficulties arose in Lowell, a rumor to the effect that a water shortage was imminent caused people to collect a reserve supply in bath-tubs and other containers with the result that normal daily consumption doubled. Eventually the polluted river water flooded the well-field and then entered an open conduit leading to a 30 m.g.d. storage reservoir located on high ground. The normal 5-day reserve supply was thus contaminated. However, emergency chlorinators were set up at the distribution main from this reservoir and a heavy chlorine residual was carried in the system, to assure sterilization. Meantime, a tubular well-supply remote from the river, abandoned some years ago because of its high iron-content, was placed in service, and this furnished sufficient quantity to take care of one-third the normal requirements.

Fire-engines relay water in Lawrence

The situation in Lawrence was perhaps the most critical. Slow-sand filters located on the river bank were completely inundated, and dependence was placed on gravity storage that was rapidly depleted by panic-stricken inhabitants who attempted to store up a reserve in every available household

SLOW-SAND FILTERS at Lawrence, Mass., were inundated by 8 ft. of flood water. CCC workers are shown cleaning off the silt.

container. Emergency supplies were obtained from neighboring communities in two ways: the hydrants of adjoining towns were connected by hose with hydrants in the Lawrence distribution system; and fire-engine pumpers were utilized to relay water through hose from nearby sources and to boost the pressure. Five engines from the Boston fire department were used in this fashion for several days.

At present all water in Lawrence is receiving double chlorination, and a residual of 0.2 p.p.m. is being carried at the storage reservoir; the state health department has kept shifts of two engineers continuously on duty to check the operation of the chlorinating machines and to make residual chlorine tests every 15 minutes.

Shortly before the river reached its crest the Lawrence pumping station employees disconnected the motors from the pumps and hoisted them to a position where they were above water, minimizing the damage to electrical equipment. When the flood receded CCC workers were put to work cleaning out the silt from the filter beds which are soon expected to be back in operation.

Laboratory workers don hip-boots

The historic Lawrence Experiment Station, now the bacteriological laboratory of the state health department, was the scene of feverish activity in making emergency water analyses of samples from the flooded areas until the laboratory itself became a victim of the rising flood. Even then laboratory technicians worked in hip-boots until the water came within two inches of the top of the tables; at this point all the samples and essential laboratory equipment were loaded into boats and moved to a house on high ground. Here analyses were continued in the cramped quarters of a kitchen using a hastily-contrived incubator built over a gas range. More than 200 samples were thus saved and analyzed.

Emergency Measures Aid Storm-Swept Tupelo

Quick action by utility operators gets aid from near-by communities and restores power to areas outside the tornado zone—Many agencies take part in rescue work

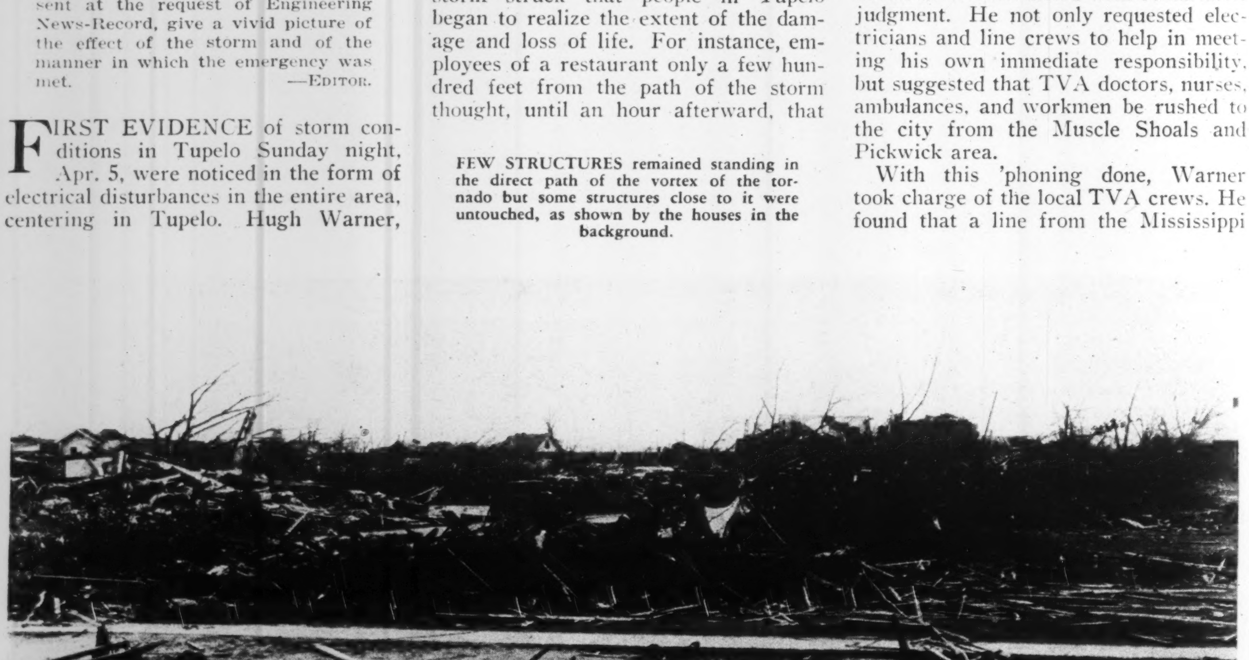
IMMEADIATELY upon receipt of word of the tornado at Tupelo, Miss., the town that obtained national prominence as the first customer for TVA power, W. L. Sturdevant, director of the information division of the Tennessee Valley Authority, went to Tupelo to report to the TVA on conditions there. The following notes, sent at the request of Engineering News-Record, give a vivid picture of the effect of the storm and of the manner in which the emergency was met. —EDITOR.

FIRST EVIDENCE of storm conditions in Tupelo Sunday night, Apr. 5, were noticed in the form of electrical disturbances in the entire area, centering in Tupelo. Hugh Warner, district manager of TVA operations in northeastern Mississippi, located at Tupelo, ordered out emergency crews and put the standby steam plant under pressure. This was at 8:30 p.m. About 9 p.m. the tornado struck.

It was not until an hour after the storm struck that people in Tupelo began to realize the extent of the damage and loss of life. For instance, employees of a restaurant only a few hundred feet from the path of the storm thought, until an hour afterward, that the city had been struck by a severe hail storm.

Warner, TVA manager, was at home. Houses on each side of his were completely destroyed, three people being killed in one, and two in another. By some storm freak his one-story brick-veneer bungalow was not even severely damaged. Warner, coming from the center of the storm and making his way to the offices down town, was among the first to realize its extent. He proceeded directly to the Bell Telephone exchange and there, working with the three girl operators on duty, managed to get a long-distance line open to Birmingham, Alabama, and a connection to Chattanooga, where A. H. Sullivan, assistant chief electrical engineer of TVA, was notified.. Warner acted with remarkable judgment. He not only requested electricians and line crews to help in meeting his own immediate responsibility, but suggested that TVA doctors, nurses, ambulances, and workmen be rushed to the city from the Muscle Shoals and Pickwick area.

With this 'phoning done, Warner took charge of the local TVA crews. He found that a line from the Mississippi



FEW STRUCTURES remained standing in the direct path of the vortex of the tornado but some structures close to it were untouched, as shown by the houses in the background.

Power Co. at West Point, Miss., was still operating, hence it was not necessary to use the steam plant. His crews then traced the line running to the city hall, court house and Lyric Theatre, which had been turned into hospitals. By 2:20 a.m. service was restored to these buildings.

Meanwhile another crew had traced the lines leading to the city's water pumping station and at 2:30 connected up the electric pumps. Tupelo gets its water from tap wells which is pumped into a 100,000 gallon tank. This tank had been destroyed by the storm so the pumps were connected directly into the city mains and at 2:30 a.m. were able to restore water for all sanitary purposes.

In the meantime, A. H. Sullivan at Chattanooga dispatched to Tupelo crews and trucks, equipped for heavy storm duty. These came from Chattanooga and the Muscle Shoals area. Five trucks and 75 men, all equipped for heavy storm duty, arrived at 4 a.m. Other crews arrived shortly thereafter. By 2:30 p.m. Monday complete electric service was restored to practically all of the city, including the business district, and even the most remote sections of the city, with the exception of the devastated area, were in operation by midnight Tuesday.

Gas service was cut off until shut-offs could be made in the devastated area. Service was restored by Monday noon.

Long distance telephone lines to Memphis, Muscle Shoals and Birmingham were working by Monday morning. Repairs to the electric system of the city of Tupelo, not including the devastated area, cost about $4,000. Another $6,000 will be necessary to rebuild the lines in the devastated part of the city. The Tombigbee Power Association which serves the surrounding counties out of Tupelo was damaged to the extent of $4,000.

Most reliable estimates of the number of homes destroyed indicate complete destruction of 350 in Tupelo proper and Willis Heights (Tupelo suburb) with 50 additional partly damaged but which can be repaired. About $1,000,000 of tornado insurance was carried on the damaged property.

Path of the storm

The storm entered the city from the southwest and cut a straight line through to the northeast, missing the business district by a few hundred feet. The vortex cut a swath about 1,500 ft. wide. There was a side-band of wind damage of two to three hundred feet on each side of this area. Few, if any, structures escaped complete destruction in the 1,500-ft. path. Where, now and then, one did, a calm appraisal would indicate that this was due to a freak of the storm rather than to the particular type of construction.

Tupelo being in a tornado area, many citizens recognized it coming, and in those few houses which had basements they were able to take refuge there and escape injury. In other homes people threw themselves on the floor and used bed-mattresses to protect themselves. Principal injuries causing death were skull fractures, crushed chests, and impaling on splinters.

TUPELO'S NEW SCHOOL and the First Baptist Church were among the more substantially built structures in the path of the storm.

Rescue work

Sullivan in his call from Chattanooga to Muscle Shoals left arrangements for rescue work with John Neeley, manager of the Muscle Shoals TVA property. Five TVA doctors, three nurses and five ambulances were sent to Tupelo, these having been taken from the Wheeler Dam construction camp, the Muscle Shoals area, and the Pickwick Landing Dam project. Neeley also called Pat Miller, chief of the reservoir clearing operations and Miller dispatched trucks and 22 foremen from Iuka, Miss. They were equipped with saws, axes, jacks, and block-and-tackles. Eighteen TVA police (all trained in first aid) were also sent. Neeley's thoughtfulness in equipping every man and every doctor with heavy duty flashlights was evidenced in the report of the doctors. Though they were kept from entering the city proper by debris on the roads they were able to reach and work in the devastated area by the aid of flash lights.

Two companies of National Guardsmen, summoned by courier from nearby towns such as Okolona and West Point, and men from one of the CCC camps arrived at about the time the TVA rescue workers were getting on the scene. The head of the National Guard placed Pat Murphy's 22 foremen in charge of companies of CCC boys. These crews did wonderful service in freeing the injured from the wreckage.

By daylight Monday help began pouring in from surrounding cities, with Governor Hugh White of Mississippi arriving in Tupelo to charge of the work. A special train carrying doctors and nurses arrived from Memphis and many of the most badly wounded were returned to Memphis hospitals on this train.

By Monday afternoon organized relief, including the Red Cross, National Guard, and state authorities, had the situation well in hand, and TVA workers were released, but not until L. H. Huntley, construction superintendent at Pickwick Landing Dam, had dispatched 65 cots and 1,000 blankets. These were sorely needed.

City officials under Mayor Nanney worked rapidly. By Monday morning a contract had been let to the Chicago Bridge and Iron Co. for a new water tank and on Tuesday morning work was started on the foundations. The new tank is being fabricated and will be completed within thirty days.

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April 16, 1936

Really Helping Roads

FOLLOWING restoration to the appropriations bill of $125,000,000 federal aid to state roads that was excluded from the President's budget for 1936-7, the House of Representatives has passed out of committee a bill authorizing the same amount of federal aid for the years 1937-8 and 1938-9. As reported by the committee, the bill also authorizes $10,000,000 a year for national forest roads and $25,000,000 a year for secondary roads, the last being a new item and calling for the creation of a division of rural roads in the Bureau of Public Roads. These indications of the belief among national legislators that federal contribution to highway development should be restored to a planned basis is decided encouragement to all who have the cause of better road transport at heart. It will react favorably to force states that have been diverting their road-tax money to restore it to the uses intended by those who pay for it. So long as state administrations and legislatures felt that they could expect from some federal emergency fund a replacement handout for roadbuilding no such restoration was to be expected. Instead greater and greater steals would be almost certain. Federal aid on the sound basis of the present House bill, coupled to a provision that no other federal contributions will be made to states for roads, will go far to get road users' tax money spent in the service of those who paid the tax. But the important benefit will be that state highway administrations can plan highway improvement as a continuing activity. On all counts, highway transport interests should get behind the present federal-aid bill to help it through Congress.

Municipal Cyclone Cellars

A REPRESENTATIVE in Congress from Florida has convinced the federal WPA that it should build a string of shelter-houses across Florida into which the people could be herded when a hurricane threatened. A sum of $300,000 has been appropriated for nine such buildings, to accommodate 200 or 300 persons each. This bizzarre plan becomes even more inexplicable when it is noted that these hurricane havens are to be used as schools during the "off-season." Why not build schools hurricane-proof and then let people use them as shelter if they wish? A $35,000 building large enough for 300 persons would not be of much use as a school. Hurricanes, unlike tornadoes, are not irresistible, as was demonstrated in the great Miami storm of 1926, when even ordinary office buildings proved to be safe refuges from the 125 m.p.h. wind. People in small towns which do not have modern frame buildings might find use for a municipal cyclone cellar, if they could get to it in time and if it was not then found to be full of street cleaning equipment or city clerk records. But if they must despair of building their houses to resist hurricanes, individual cyclone cellars in the back yard, three steps from the kitchen door, are the answer. For office, commercial and industrial buildings, however, the solution lies in adequate design which is both physically and economically possible. The one thing that is not needed is a municipal cyclone cellar.

Salt of the Earth

OF INCREASING CONCERN to purveyors of potable water and to those interested in the abatement of stream pollution is the alarming rate of salt brine contamination emanating from oil well fields in the various parts of the country. One of the fields opened in Michigan only a year ago is said to be producing nearly a half million gallons of brine every day, part of which finds its way into the Saginaw and Grand rivers. The latter is the water supply for Grand Rapids, and that city has protested vigorously to state sanitary officials. In Oklahoma City the extension of drilling operations within the city limits has intensified saline stream pollution to the point where it is a factor of major nuisance. For many years the Arkansas River has been getting saltier, and brackish backwater finding its way into the water supply of Fort Smith finally forced that city to seek another source (*E.N.R.*, Feb. 13, 1936). Several Kansas and Oklahoma cities have similarly suffered. This recital of a few typical cases concretely illustrates the scope of the brine pollution problem. The closest cooperation between oil well operators and sanitary engineers is needed if the development of one great natural resource is to be pursued without detriment to another more vital one.

Highway Partnership

EFFECTIVE COOPERATION between the state and the counties in Alabama is ensuring a large mileage of more highly improved roads than could be constructed by either alone. As described in this issue, the plan includes a third contributor in the relief works administration but it is as applicable without this emergency partner although possibly on a more restricted scale. Means and methods are explained in the article: the important fact of interest in this place is that cooperative instead of separate administration of road improvement has been harmoniously worked out without loss of independence by county or state—each is a self-determining party in a contractual agreement. This arrangement offers a solution to a highway problem that exists in many states. The development of federal-aid and road users' tax legislation has emphasized the independence rather than the mutuality of county and state responsibilities for road improvement. Somewhat closer cooperation has developed in recent years but by and large independence of road control by state and local government has been and still remains marked and mutually truculent. This is the situation that has been overcome in Alabama by the simple and common-sense means of entering into a contract to combine forces for a common objective of securing better roads more quickly than they could be secured by state or counties alone.

Unconsidered Requirements

WHEN CONSTRUCTION BUDGETS are considered or estimates of needed construction are set up, the data are often misinterpreted because no distinction is made between replacement construction and new construction. This is in part because works once built are thought of as permanent and everlasting, which they are not—not only do they deteriorate through wear and weather, but they also become obsolete from change in service demand. For this reason replacement requirements claim an important place in construction plans. Thomas H. MacDonald pointed out in a recent address that physical deterioration alone calls for 26,000 miles of road construction per year, which is more than the total annual construction program in the busiest years of a decade ago; and obsolescence would add more miles to that needed for mere upkeep of our existing road property. Such illuminating facts show that our construction job is larger and more serious than is usually thought. The facts address themselves particularly to public officials, for theirs is the task of planning and budgeting improvement work. In other fields somewhat similar conditions prevail, as for example in housing; but here, and particularly in housing, variations in demand make the problem essentially different. Though the need for housing construction may be fairly constant from year to year, actual demand will vary enormously. In the domain of public works, however, planning and budgeting based on analysis of replacement requirements together with those of growth is an important agency for stabilization of construction.

Order from Chaos

THERE ARE FEW occasions which call for a more demanding display or organization than the emergency created by flood destruction. With essential services paralyzed and with little in the way of precedent for guidance the mobilization of man-power and equipment offers a problem huge in proportions and complicated in structure. Present progress in rehabilitation being made in the flood-devastated regions of the Northeastern states illustrates a remarkable coordination of effort and a splendid spirit of cooperation among the many agencies engaged in restoring order from chaos.

Outstanding is the work being done by WPA and CCC forces whose existing organization before the flood made possible their availability and immediate utilization when the emergency arose. Without these well-distributed armies of workers the tremendous job of mopping up the flood-soaked areas and the restoration of temporary services would have been sorely retarded. Nevertheless, these agencies would have been handicapped had they not been under the direction of the city engineers and other public-works officials who were familiar with local conditions.

It stands to the credit of many local municipal engineers that they foresaw the coming of a flood and, realizing that it might be of considerable magnitude, organized such preparation as could be made some time in advance. When the flood did come it was the city engineers in most instances who initiated the defensive measures. In this work and in the work of temporary rehabilitation they depended on the close cooperation of the WPA or CCC men.

The relief-labor organizations furnished much more than mere man-power and equipment. They brought to the limited public-works organizations of the crippled communities the added direction and drive so vitally needed to meet the emergency. Everywhere they performed the disagreeable and back-breaking task of removing debris, mud and slime from the streets, yards, homes and stores. Most important of all, their coming relieved the local communities of the heavy expense of cleaning up. Without this automatic financial aid the flood's destruction would have been much worse, and weeks would have been required to equal the restoration accomplished in a few short days.

Back the League

THE CONSTRUCTION LEAGUE has launched a drive to have government construction put back on a normal basis as soon as possible. The League seeks to bring an end to the prosecution of regular federal construction by relief agencies using relief labor. Where it is necessary to continue relief operations it recommends that the work should be limited to special work not included in the regular program of the federal departments and bureaus. Regular work should be carried on by normal construction procedure. Finally, the League urges that the PWA be not dropped abruptly but that it be curtailed gradually to prevent disruption of the construction agencies set up to carry out the PWA program and to provide a transition period in which local communities can continue to draw on the PWA resources until such time as they can obtain all their construction funds in a more normal manner.

In concentrating its attention upon this important matter of turning federal construction back into its normal channels, the Construction League is doing a notable service not only to the construction industry itself but also to the nation as a whole. The construction industry, for its own-self-preservation, needs to have a quick check put on the insidious spread of the idea that anyone can direct a construction operation and that almost anybody can do construction work. The nation needs to have the economic unsoundness of this idea exposed if its funds are not to be squandered on poor and costly work. Far too much construction that can and should be done by regular agencies using normal construction methods now is under the control of relief agencies.

Just now the relief agencies are very much in the saddle. Witness the curtailment of money that Congress clearly intended should go to the PWA under the 1935 Relief Act, also the total absence of any reference to PWA in the President's recent statement to Congress that $1,500,000,000 would be required for relief during the coming fiscal year. Unless there is a change in the Administration's attitude there will be no more PWA with its stimulating effect on local public works done by normal contract methods, and there will be a further extension of WPA into all fields of public construction.

A joint resolution introduced into Congress by Senator Hayden and Representative Beiter calls for the allocation of $700,000,000 of new relief funds to PWA to be distributed on a loan-and-grant basis. If approved this resolution may make possible nearly $1,500,000,000 of PWA construction, assuming that as financial conditions improve more and more cities will take only the federal grant of 45 percent.

It is essential, therefore, that the construction industry support the Construction League in what it is doing. Fortunately the League has the support of the American Federation of Labor, the federation officials having at last recognized that their welfare is inseparably tied up to that of the construction industry. But the League needs other support. Unless the whole industry and all who depend on it stand back of the present move to turn the flow of federal funds back into normal channels, the gains already made cannot be maintained.

CURRENT NEWS

Florida Canal and Quoddy Must Get Approval of Congress

No more funds will be allotted to the Florida Canal and the Passamaquoddy tidal power project unless they are approved by Congress, according to a statement made by President Roosevelt on April 15, nor will relief funds be provided on the present basis. In his statement the President intimated that he may recommend modification of both projects to Congress.

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RFC to Open Special Offices For Making Disaster Loans

The Reconstruction Finance Corp. will set up special loan offices in Tupelo, Miss.; Hartford, Conn., and Springfield, Mass., as soon as one of the bills liberalizing disaster loans becomes effective. Also such an office will possibly be opened in Pittsburgh. A bill has passed both houses and the House has accepted the conference report providing for a loan limit of $50,000,000 and including a Senate amendment authorizing the use of FHA facilities for rehabilitation in flood and tornado areas.

RFC has also approved a $2,000,000 loan to the Boston and Maine R.R. subject to approval of the ICC. Other railroads will repair flood damage from current revenues. Special offices will also be opened at Atlanta, Ga., to serve the Gainesville area.

Major-General Markham, on April 15, reported favorably to the Senate Commerce Committee on 200 flood control projects costing $85,000,000 but rejected water power projects totaling $410,000,000. Five out of 50 of these were approved as feasible if a power market could be developed. The committee tentatively added the 200 flood control projects to the pending omnibus river and harbor bill, bringing the total to $400,000,000.

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Agitation Increases for Added Public Works

Washington Correspondence

Agitation for continuing construction of municipal public works by a further allotment to the Public Works Administration for loans and grants has failed to evoke any response from President Roosevelt. Without his support this move has no hope of success. The new appropriation of $1,500,000,000 which he has requested is barely sufficient to carry the WPA work relief program until next spring. At WPA's present daily rate of expenditure of $6,470,000 this new appropriation, plus its unexpended balance of $583,500,000 on March 31 would be exhausted by February 14, 1937, but Administrator Hopkins is planning to reduce WPA rolls from 3,039,000 to 2,300,000 by the end of June. The number employed on WPA projects will, of course, increase again in the fall.

A House bloc circulated a petition this week asking President Roosevelt to earmark $700,000,000 for PWA out of the appropriation of $1,500,000,000 which he has recommended for WPA. This was regarded as presaging a revival of last year's contest between Administrators Hopkins and Ickes for funds but Administrator Ickes stated on April 14 that he had not conferred with the President on the subject of more relief money. At the same time he issued a statement showing the average man-year cost on 1,000 completed PWA projects to be $741.60. Later, the President pointed out that this figure was based on the 30 per cent federal contribution and so could not be compared with the WPA figure, indicating opposition to the PWA type of relief.

Canada Sets Up Employment Commission

A program of planned public works, to be carried out in conjunction with provincial and municipal authorities, at a cost of about $100,000,000, has been proposed as a means of handling the unemployment problem in Canada. Before adjoining for the Easter recess, the federal parliament of Canada gave final approval to a bill, introduced by the government to permit the setting up of a National Employment Commission, and during the discussion of the bill the proposed public works program was announced by the prime minister.

Engineering and Economic Conditions in Texas and New Mexico

Trip through southwest states reveals an increased activity in construction industry and agriculture—Work at Red Bluff Dam reported well ahead of schedule—Texas Centennial spurs business

Special Correspondence

GENERAL CONSTRUCTION expansion, improved economic conditions and an air of well-being, as evidenced by experience gained in a ten-day drive, covering 1,500 miles in southwest Texas and southeast New Mexico, during latter part of March and the early part of April, confirmed a previous impression that this section will make definite advances during the coming season unless some unforeseen major disaster occurs.

West from Dallas, Tex., on Highway 80, road construction was found under way at various points throughout the drive to Pecos. In addition to this, the cities along the highway were found to be busy on street work, construction of new schools, store buildings and residences.

Red Bluff Dam progress

During a visit to the Red Bluff Dam, Vernon Sullivan, engineer, pointed out progress on the construction of this project, which is well under way. The work is six months ahead of schedule. The dam is a semi-hydraulic fill structure. The earth is dumped into a pool in the middle of the dam and sluiced into position from the point of dumping. Numerous samples and tests are being kept up to date in order to control the composition of the core. The upstream face is protected by an unusually heavy blanket of riprap on account of the prevailing high winds in this section. The Red Bluff reservoir will store water for a large irrigated area along the Pecos River. This area has suffered from a lack of water for a number of years due to insufficient storage.

The highway from Pecos to Carlsbad, New Mexico, which has been newly constructed, is in the nature of a speedway, due to its wide asphalt pavement with easy sloping shoulders, slight traffic and visibility averaging at least 5 miles.

Carlsbad is suffering from an overexpanded paving program and many properties are being foreclosed for the paving liens. On the other hand, there are a large number of new residences under way and housing is inadequate to meet the demands. Some industrial plants in the vicinity are working 24 hours a day. Carlsbad Caverns continue to draw a large number of visitors even in what is considered the off season, and a number of men are now employed in the construction of trails, ramps and steps in the Caverns, replacing many of the wooden steps with either ramps of concrete or concrete steps.

The road north to Roswell, N. M., passes through some fine irrigated land, where everyone seems to be busy breaking ground. The impression gained throughout the entire trip is that much land, which has been idle for the past few years, is being placed under cultivation again this spring. Although Roswell seemed to be a busy town, there was little evidence of new construction.

West from Roswell, through the National Forest and the Apache Reservation, fine roads were encountered. The work of the CCC in clearing undergrowth and rubbish from the pine forest floor was very much in evidence.

Improvements planned at El Paso

South to Tularosa, N. M., and on to El Paso, the highway skirts a sand desert on the west of the road and, with a high west wind, there was too much sand in the air for comfort. This is a fine road, with a short detour around some new construction. The El Paso water department under superintendent A. G. Classen, is planning a number of improvements and at present is carrying on a fairly large amount of current construction and extensions. A visit to the offices of the International Boundary Commission shows work being planned for flood control and other international works.

East from El Paso along Highway 80

to a point east of Van Horn, through rough country, the highway is being planted with cactus of various kinds and a very effective result is being secured. This road has recently been relocated and rebuilt, providing a fast, safe route. El Paso and the towns along Highway 80 appear to have recently gone through a clean-up campaign. The streets are clean, store fronts improved and painted, houses brightened up and the lawns and shrubs trimmed.

Turning off the highway near Kent and driving to the southeast, through Balmorrea, Fort Stockton, Kermit and Big Lake, one notices that the oil fields are busy with new drilling and that range land is well stocked with cattle, sheep and goats, all in good condition. The price of mohair and wool is at a peak, while increased oil production has been stimulating road construction and the paving of city streets. From San Angelo to Dallas nedeed road work is under way.

Evidence of a state-wide clean-up campaign is noticed all along the way and, as mentioned before, a large amount of farm land, formerly idle, is being broken for crops.

In Fort Worth and in Dallas, the Texas Centennial celebration has resulted in great building activity.

◆

Engineers Honored at Anniversary Dinner

Edward Flad, Charles D. Purdon and Silas Bent Russell were the honor guests at a golden anniversary testimonial dinner given by the St. Louis Section, American Society of Civil Engineers on March 23. All three have been members of the society for fifty years.

Mr. Flad is a member of the Mississippi River Commission and has served at various times as water commissioner, as a member of the St. Louis Board of Local Improvements and as a member of the Missouri Public Service Commission.

Mr. Purdon, who is 86 years old, was at one time, chief engineer for the St. Louis & San Francisco R.R. and also chief engineer for the Memphis Terminal. In 1918 he was made chief engineer for the St. Louis Southwestern Railway and later became consulting engineer.

Mr. Russell for 35 years served in various capacities in the St. Louis Water Department, and later designed water systems for several cities while serving as consulting engineer. From 1916 to 1924 he was with the Parker-Russell Mining & Manufacturing Co., St. Louis.

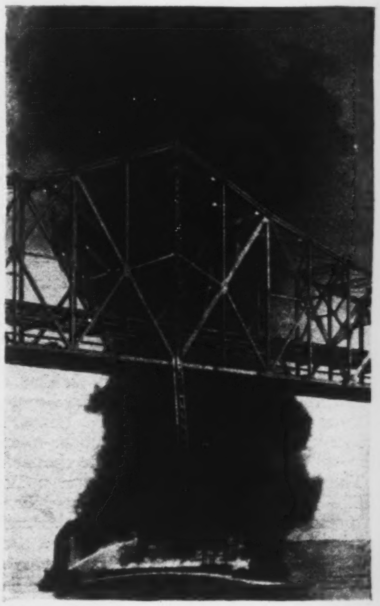
◆

Group Organized for Temperature Research

Recognizing the need for research, and education on the scientific progress, in temperature as it relates to refrigeration and air conditioning, the Kelvinator Corp. has organized the Temperature Research Foundation, with offices in New York City, to carry out and direct additional work along these lines and to make public the latest developments in temperature engineering. The Foundation will have the cooperation of an advisory committee of specialists in economics, architecture, and design and health. The Foundation will function as a clearing house for authoritative information on temperature research work.

Pier Fender Destroyed by Fire on San Francisco Bay Bridge

The creosoted timber fender on pier E-3 at the east end of the long cantilever span of the San Francisco-Oakland Bay Bridge caught fire on April 6, possibly from a hot rivet accidentally dropped from the steelwork above and the fender was almost completely destroyed. The fire started about 11 o'clock in the morning and, despite prompt efforts of workmen to put it out, gained headway rapidly. By the time fire tugs could be brought to the scene the fire had enveloped most of the fender and about an hour was required to extinguish it. The cost of replacing the fender is estimated at about $20,000. Minor damage to the surface of the concrete occurred in the form of chips spalled off by water applied to hot surfaces. There was discoloration of paint on the steelwork of the tower but it is believed that there was no serious damage to the pier itself or to the steelwork resting upon it. The fender construction was very similar to that, shown in *Engineering News-Record*, April 5, 1934, p. 434, for the west bay piers. It is believed that the concrete apron which supported the treated timbers a considerable distance from the steelwork was a factor in protecting the steel tower from damage.



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Identical Bidding Stirs Protest

Identical bidding on Bureau of Reclamation contracts drew a protest from Secretary of the Interior Ickes and a threat by Senator Wheeler, chairman of the Senate Interstate Commerce Committee, of anti-trust action against the cement industry.

Four identical bids were received for supplying cement for use on construction of Arnold and Hamilton dams on the Lower Colorado River project in Texas. A contract was awarded to the Republic Portland Cement Co., of San Antonio, as a 30-day clause in the bids submitted by the other companies had expired. Its plant at Longhorn, Tex., likewise is the nearest to Beverly, the delivery point. The contract calls for 20,000 bbl. of standard bulk cement, 5,000 bbl. of standard sack cement, 290,000 bbl. of modified sack cement and 50,000 bbl. of modified bulk cement for a total of $835,159.

Inquiry concerning the transaction was made by Senator Wheeler in conjunction with hearings on his bill to eliminate the basing point method of establishing delivered prices. By questioning B. F. Affleck, president of Universal Atlas Cement Co., one of the bidders, Senator Wheeler brought out that the net mill price of the several bidders varied considerably despite the fact that all of them quoted an identical price for delivery.

Alleging that delivered price contracts are costing taxpayers millions of dollars a year in excessive charges, Senator Wheeler declared that "if the industry will not correct them from within, then the government will have to correct them as clear-cut violations of the anti-trust laws."

Prima facie evidence of collusion was charged by Secretary Ickes in announcing award of a contract for supplying insulated cable for the Boulder Dam power house to Simplex Wire & Cable Co., of Boston, one of twenty companies submitting identical bids of $104,484.31. Mr. Ickes stated that he would have liked to reject all the bids but that the cable is needed for the first battery of generators. Readvertisement would entail delay of 60 days, with no assurance, according to Secretary Ickes, that the same thing would not happen again.

◆

Court Refuses to Vacate Buzzard's Roost Stay

The motion of Greenwood County, S. C., and the PWA to vacate a stay of mandate, granted to the Duke Power Co. at the time the federal circuit court of appeals denied the company's petition for an injunction to prevent construction of a proposed power plant at Buzzard's Roost, was denied by the court on April 9. PWA sought to have the stay vacated on the ground that the power company was delaying its appeal and would thus prevent the case from being heard until next fall. The Duke Power Co. had received a 40-day stay of mandate on March 17 after the circuit court had denied its petition for an injunction to prevent construction of the $2,852,000 power plant.

◆

Housing Program Seen Unlikely During This Congress

That no housing program of any kind is likely to come through at the present session of Congress is held to be due to the amount of time lost in discussion on this type of program. The latest development since the extension of title I of the National Housing Act, on April 1, providing for the continuation of the work until April 1, 1937, is a proposal by savings and loan associations, which fear that the FHA system has an unbalanced appeal for commercial banks, that the Home Owners Loan Corporation buy second mortgages. The second mortgage would run at 5 per cent until the first mortgage is paid off in fifteen years. Without an insurance premium, which brings the effective interest rate on FHA mortgage loans up to 6.24 per cent, this would discourage banks and other lending institutions which now are doing an increasing volume of business on FHA terms.

This proposition has the tacit endorsement of the HOLC, which believes that home financing should be left to institutions of the time deposit type. Such a proposal would fit in with the federal savings and loan system and would convert the HOLC, which is slowly being liquidated, into an active underwriter of home building. This plan, however, has met with objections from sponsors of the FHA objectives, which are to eliminate dual mortgages, consolidate the loans at a figure high enough to stimulate home building and cover the added risk and to insure mortgages, thus attracting more financial institutions into the home finance field.

◆

Brief News

Hurricane shelters to provide protection during hurricanes for people of the nearby communities are to be erected in Florida by the WPA. The houses, which will accommodate from 200 to 300 persons, are to be built of reinforced concrete. They are to be equipped with weather instruments and with radios or sirens for summoning persons in the danger areas. It is expected that nine hurricane houses will be built in the Lake Okeechobee and the Florida Keys regions this season, at a cost of about $300,000. The complete program calls for at least twenty buildings. These buildings will be used normally for schools, churches and general civic purposes.

South Carolina Supreme Court ruled unanimously, April 13, that Governor Olin D. Johnston's suspension of ten state highway commissioners was "null, void and of no effect."

A survey by the Mississippi state highway department preparatory to securing the right-of-way for the Natchez Trace Parkway project is to be started soon. The highway department has authorization to spend up to $200,000 in acquiring rights-of-way. First work will extend along a 13-mile section from Natchez northward. As the paving of the Trace from Natchez to Nashville would require large sums, and as the federal government has made available only slightly more than $1,000,000 for the launching of the project, the paving will start at Natchez and extend northward over the 400 mile route (*ENR*, Dec. 5, 1935, p. 792).

The Delaware & Raritan Canal to provide a ship channel across New Jersey from Raritan Bay to the Delaware River has received an unfavorable report from the Corps of Engineers. The army engineers held that the benefit to be derived from the improvement would be small compared to the probable first cost and the high cost of operation and maintenance.

Suits to enjoin the federal government from furnishing funds for the proposed $37,500,000 Santee-Cooper hydroelectric project will be heard by the U. S. district court between May 11 and June 1. The Carolina Power & Light Co., the South Carolina Power Co., and the Broad River Power Co. have instituted proceedings to restrain the PWA from furnishing funds for the project (*ENR*, Oct. 3, 1935, p. 481).

Would Substitute Bridge For Tunnel

Manhattan Borough President would build bridge over East River at New York in place of approved tunnel

Construction of a bridge over the East River at New York in place of the proposed vehicle tunnel at 38th Street (*ENR*, Jan. 9, p. 64) for which the PWA has approved a combined loan and grant of $58,365,000, is proposed by Samuel Levy, president of the Borough of Manhattan, according to an announcement made on April 13 by J. S. Langthorn, consulting engineer of the Department of Public Works of Manhattan. From the saving made by substituting a bridge for the tunnel the borough president would build crosstown vehicle tunnels under 37th and 38th streets in Manhattan to connect with the Midtown Tunnel now being built under the Hudson River to New Jersey, thus giving a direct connection between New Jersey and Long Island without using the congested streets of Manhattan.

Arch bridge proposed

Construction of a steel arch bridge of two spans of 1,500 ft. each, with a center pier on the reef below Welfare Island is proposed. It would have an under-clearance of 135 ft. over the navigable channels.

The bridge would be about on a line with 41st St., Manhattan, but would have its principal approaches in a plaza extending from 1st to 3rd Avenues, between 37th and 38th Sts. where connections could be made to the proposed cross-town tunnel. This is in the same area in which the tunnel plazas are to be located. A new street from 42nd and 34th Street would give additional access to the plaza. At the easterly end of the bridge connections would be made to the principal thoroughfares in Long Island City and by a bridge over Newtown Creek to a new approach street in Brooklyn.

It is estimated that a 6-lane bridge can be built for $22,000,000 as compared with $58,000,000 for a 4-lane tunnel. The cost of the crosstown tunnels in New York is put at $32,000,000, thus leaving $4,000,000 to build approaches in Long Island City and Brooklyn. Four lanes on the bridge would be for passenger cars, thus giving doub the passenger-car capacity of the tunnel.

Maintenance cost of the tunnel is put $1,500,000 per year as compared wi $500,000. No figure is given for the cost maintaining the cross-town tunnel, whi would be toll-free.

Legislation will be required to permit t New York City Tunnel Authority to bui the bridge, and a new agreement wou have to be made with the PWA and t RFC for financing.

It is estimated that the bridge could built in three years, in time for the Worl Fair in 1939.

The New York City Tunnel Author has just had its budget approved by t PWA and has begun to organize its co struction forces.

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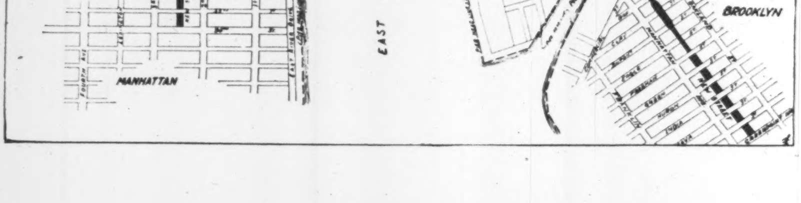
Extensive Improvements for Detroit Edison Co.

For new construction during 1936 th Detroit Edison Co. plans to spend abou $9,000,000. Of this amount, nearly $3-250,000 will be spent in rebuilding th Connors Creek power plant. In this plan the three 20,000 kw. turbo-generators hav been replaced with three 30,000 kw. unit. The existing 30,000 kw. unit has been removed and the space will be used for tw 3,000 kw. house service units and the tw 45,000 kw. units may be replaced wit 60,000 kw. units.

An addition has been made to the turbine room which will house two additiona 60,000 kw. units. One of which will g into service about Dec. 1, and the other one in the fall of 1937. The rebuilt plant, when completed, will have a capacity of 330,000 kw., as compared with the original capacity of 180,000 kw.

Among other projects in the 1936 construction program is the installation of a 36 in. pipe line from a neighboring steel plant to the Delray power plant for the transmission of blast furnace gas to be burned in the boilers of the power plant. About $200,000 will be spent for additions and improvements to existing substations. Among these will be the installation of additional capacity at the substation at the Great Lakes Steel Co. Another job, estimated to cost $90,000, is the erection of a modern residential type substation to replace the temporary steel building known

AN ARCH BRIDGE with two 1,500-ft. spans across the East River at New York is proposed in place of the vehicle tunnel upon which work is ready to start.



as the Hoover Substation, which serves a large portion of the city of Ann Arbor. About $1,000,000 will be spent on improvements to overhead and underground lines.

Nearly $2,000,000 will be required for new business extensions and the purchase of electric meters and line transformers to provide for service to new customers and increased consumption. Included in this amount is an appropriation for about 500 miles of farm lines.

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Contract Cancelled For Locks at Dam 26

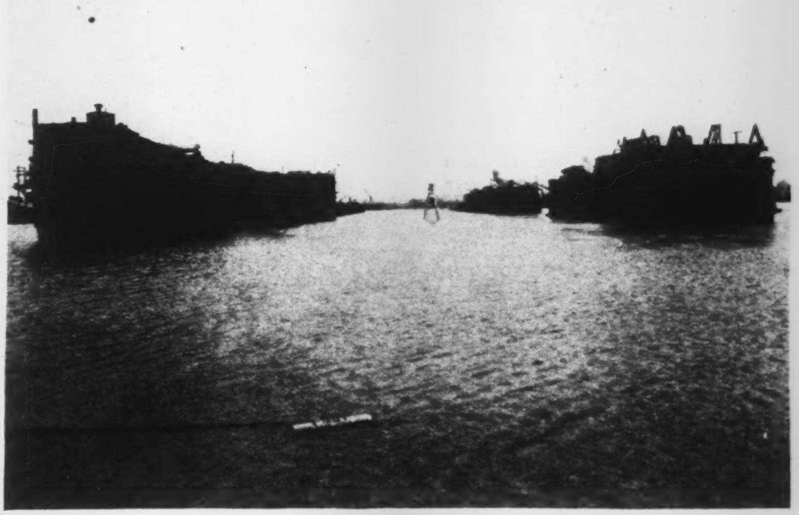
John Griffiths & Sons Co. quits Mississippi River job after completing one of two lock chambers

THE CONTRACT of John Griffiths & Sons Co., of Chicago, for the construction of the double locks at Dam 26 on the Mississippi River at Alton, Ill., has been cancelled, according to an announcement by Col. P. S. Reinecke, U. S. District Engineer at St. Louis. Cancellation of the contract by the War Department on Apr. 9 was based on alleged insufficient progress on the auxiliary lock, and followed a declaration by the contractor that he was quitting because the government had breached the contract by permitting another contractor to start work before the auxiliary lock was completed. The contract was let to the Griffiths Co. in January, 1934, for $3,194,702, calling for the construction of two locks, a main chamber, 110x600 ft., and an auxiliary chamber, 110x360 ft., on the river side of the lock structure. At the termination of the contract the work was reported to have been about one year behind schedule. The main lock had been completed and accepted; the cofferdam for the auxiliary lock was under construction. It is estimated that $750,000 worth of work remains to be done.

Cofferdam lost in flood

As reported in these pages last week, the cellular cofferdam being built to enclose the auxiliary lock area was lost in the floods of last month. The lower arm and most of the river wall had been completed, and the rising water pouring in at the open upper end created a head differential sufficient to topple the cells outward. At the center of the lock, in line with the dam being built from the opposite shore by Engineering Const. Co., a hole estimated to be 80 ft. deep was scoured out by the flood. Into this hole disappeared the cofferdam river wall, two carloads of undriven steel sheeting and a locomotive crane. As the flood receded the hole backfilled with sand, and all this material was buried at an unknown depth. Loss of the cofferdam alone is estimated at $200,000.

The dam is being built in three sections, the first of which was completed the day before the cofferdam was overtopped. It is reported that the contractor on the dam will be given right-of-way over the lock work, and will be permitted to complete the dam before the auxiliary lock is to be built. How to cofferdam the third section of the dam, where the debris lies buried, will be a problem. On the dam it was found necessary to build a cofferdam 450 ft. wide to get adequate berm support for a 125-ft. bottom width.



COFFERDAM FLOODED AT PICKWICK DAM

High water in the Tennessee River flooded the cofferdam within which the Pickwick Dam lock is being built. This picture, looking into the lock chamber, should be compared with the one on the cover of this issue to get an idea of the depth of the water. Before the crane, whose top shows above water in the center of the picture, was put out of commission, it set cars and other equipment on top of the walls above the point reached by the water.

Florida Engineers' Meeting Draws Large Attendance

Problems met on the Atlantic-Gulf ship canal, the location of tropical storms and a method of rating the efficiency of low-head pumps, among papers read at technical sessions of twentieth annual meeting of Florida Engineering Society

THE LOCATION of tropical storms by means of the cathode ray oscilagraph demanded much attention from the large group attending the twentieth annual meeting of the Florida Engineering Society at Daytona Beach, April 2-4. A method of rating the efficiency of low-head irrigation and drainage pumps pointed out the advantages of using the pool-to-pool basis for rating. The report of the highway committee told of experiences with sand-bituminous mix roads, and the report of the committee on railroads indicated that Florida has already an adequate system of inland transportation and further pointed out that railroad costs per ton-mile are cheaper than those of either waterway or highway transportation.

Among other papers presented was a brief historical summary of the inception of the Atlantic-to-Gulf waterway across Florida by Col. G. A. Youngberg, who also read the report of the committee on rivers, harbors and waterways. General engineering and construction features of the canal were discussed by Col. Brehon B. Somervell, Corps of Engineers. The geology of the canal route and its bearing on the underground water reservoir was discussed by Sidney Paige, senior geologist, U. S. Engineer Office. Some of the bridge problems met in connection with the canal were described by William P. Grove, principal engineer of the bridge section. Foundation conditions in the lime rock section of Florida were pointed out by W. Austin Smith, consulting engineer, Jacksonville.

A report of the Committee on Highways, prepared by H. C. Weathers, pointed out recent developments on sand-bituminous road mix used by the Florida state road department. When the first roads were built in this manner, the bituminous material used was cut-back asphalt, consisting of 85 to 100 penetration asphalt with the naphtha specification covered by the distillation requirements at 437 deg. F. Later trouble was experienced because the mixture contained numerous lumps. Investigation showed that fieldmen were heating the cut-back asphalt, thus driving off a large portion of the naphtha, making the asphalt stiff and preventing thorough mixing. After that specifications were changed requiring distillation, at 302 deg. F., of 0 to 5 per cent and field men were cautioned not to heat the asphalt unless necessary, and then not to more than 120 deg. F.

When this type of road pavement was used the department made tests of the proposed material to determine its gradation and its clay and silt content. These tests were made only as a matter of reference, as practically all existing materials are poorly graded from the standpoint of satisfactory bituminous construction and to correct them would offset the advantage of the low cost type.

Locating tropical storms

The location of tropical storms by means of a cathode ray oscillograph was the topic of a paper read by Wayne Mason, of the University of Florida, who also mentioned that perhaps other atmospheric disturbances could be located by the same method. This method consists, essentially of picking up the static discharges occasioned by storms and recording them through a cathode ray tube on to a photographic film.

The University of Florida and the University of Puerto Rico each have a recording station and radio telephone stations have been set up to permit comparison of the bearings as soon as the films are developed.

Rating low-head pumps

The method of rating low-head pumps was discussed by R. O. Couch, who pointed out the Two-Way Pump covered by patent issued to him in 1933, as an example of a correctly designed low-head pumping unit. Rating the efficiency of pumps on a basis of dynamic head was held to be not applicable to low-head pumps where friction and velocity might equal the static heads, thus, if the dynamic efficiency were 90 per cent, the static head efficiency would be only 45 per cent. Low-head pumps, operating on a two to thirty-foot static head, should thus be rated on a pool-to-pool basis.

Commodity transport cost

A comparison of the cost of handling commodities by rail, highway and waterway in Florida was the subject of the report of the Committee on Railroads, read by J. E. Willoughby, chief engineer, Atlantic Coast Line R. R. By an appraisal of all expenditures pertaining to initial cost, development cost and annual cost, it was found that the railway transport rates in the Florida Peninsular cover all costs and that the average present cost by rail for commodity transport is 15 mills per ton-mile. On the other hand the present cost of highway transport and waterway transport includes only the cost of vehicle and conduct of transportation, including fuel and such taxes as may be paid. The remaining costs are borne by the public treasury. It was found that the comparative costs of commodity transport in the peninsular was railway, 1.05 cents per ton mile; highway, 19.0 cents per ton mile; waterway, 2.1 cents per ton mile.

It was also pointed out that considering the transport facilities on the peninsular as a whole, there has been an over-expansion and over-production of transportation facilities at public expense and beyond reasonable demands of the population and beyond the financial ability of the people to sustain, on account of the load of the direct sales taxes that have to be carried to pay construction and maintenance of transportation projects. It was also found that highway and railway transportation costs are not directly comparable because they represent, in many instances, a totally different type of service. This is shown by an actual ton-mile cost of 8.09 cents based on the figures of a 2½ ton truck as developed by the U. S. Post Office Department. This is held to show that it is not possible to justify highway construction on the basis of commodity transport needs, because these needs can be more economically met by assisting railway or waterway facilities for distances of 50 miles and more. Highway commodity transportation is properly to be regarded as more of a supplementary than a competing facility. Therefore, highway commodity transport should be discounted from the justification of new highway construction, and by eliminating heavy trucking from the highways maintenance costs might be reduced in excess of the loss in revenue from the gasoline and other taxes.

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SOCIETY CALENDAR

CONCRETE REINFORCING STEEL INSTITUTE, annual meeting, Hot Springs, Va., April 20-22.

MIDWEST POWER ENGINEERING CONFERENCE, Chicago, Ill., April 20-24.

AMERICAN SOCIETY OF CIVIL ENGINEERS, spring meeting, Hot Springs, Ark., April 22-24.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION, annual meeting, Chicago, Ill., April 23-25.

MINERAL INDUSTRIES CONFERENCE, research meeting, Urbana, Ill., April 24-25.

NATIONAL RIVERS AND HARBORS CONGRESS, annual meeting, Washington, D. C., April 27-28.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

THIRD WORLD POWER CONFERENCE, Washington, D. C., September 7-12.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

NEW ENGLAND BUILDING OFFICIALS CONFERENCE, annual meeting, Boston, Mass., April 20-22.

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS, annual meeting, New York City, May 23.

CHICAGO CHAPTER, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS, meeting on April 3, elected the following officers: **H. J. Fixmer**, president; **Robert L. Anderson**, vice-president; **Harold A. Vagtborg**, secretary-treasurer and **W. W. DeBerard**, national director.

EXAMINATIONS for the registration of professional engineers will be held in:

WISCONSIN—At the office of the State Architect, Madison, April 22-24.

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New Homes for Tupelo Planned By Resettlement Administration

Resettlement Administration officials in Washington and Little Rock, Ark., are rushing arrangements to start work on the rehabilitation of Tupelo, Miss., which suffered severely from the effects of a recent tornado.

Construction of fifteen small homes in addition to the 25 already set up by the Administration, is contemplated. That number may possibly be increased to 100, according to a statement by T. Roy Reid, regional director for the district, provided sufficient suitable land can be obtained.

The 25 original homes were located on small individual tracts of 3.8 acres each. The houses contained from three to five rooms and were supplied with a garage, a barn, a small orchard and a garden. The houses were occupied by low income industrial workers, when the storm struck the community, missing the project, but playing havoc with the rest of the town.

One immediate result of the storm was a demand for increased housing. The Resettlement Administration announced that the government would meet the demand by constructing fifteen new homes and that construction would commence at once, on land already government property. The Administration appropriated $30,000 to start work.

Regional director Reid supplemented this statement with the announcement that efforts would be made to find suitable land for more homes, and sent officials to Tupelo to investigate with this objective in view. In Tupelo they are hoping for the larger number of homes to care for the storm victims.

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Obituary

Otto Schmitz, St. Louis, Mo., civil engineer, died there April 6, at the age of 79. He was graduated from Zurich Polytechnic Institute as a civil engineer. After graduation he was employed to survey right-of-way for the Denver & Rio Grande R. R. He went to St. Louis in 1885 and entered the employ of the Pitzman Surveying Co. and later was made vice-president.

C. Howard Walker, Boston architect, died there on April 12, at the age of 79. Mr. Walker, who was internationally known as an authority on architecture, was chief architect for the Omaha Exposition in 1898 and the St. Louis Exposition in 1904. He first studied architecture with a Boston firm and later studied in New York, Asia Minor and Europe. In 1884 he returned to Boston and began practice under the name of Walker & Kimball. In 1933 Mr. Walker retired as professor emeritus of the architecture department of the Massachusetts Institute of Technology after an association of 49 years. Mr. Walker had been editor of the Architectural Review.

Charles T. Harding, formerly a street commissioner at Boston, Mass., died at his home there on April 9, at the age of 55.

Werner Hegemann, internationally known for his work in city planning and architecture, died in New York City, April 12, at the age of 55. Mr. Hegemann, who was the author of *City Planning Housing*, had been associate professor in architecture at Columbia University for the past year and also held the position of visiting professor of city planning and housing at the New School for Social Research. He was born in Germany and was graduated from the University of Berlin. In 1905 he became housing inspector for Philadelphia, Pa. He later returned to Germany and entered into an aggressive campaign for better housing conditions in Berlin. On his return to the United States in 1913, he conducted a number of planning projects for San Francisco. From 1916 until 1921 he directed real estate division in Wisconsin and Pennsylvania. From 1924 until 1933 his principal work was editing two architectural reviews in Berlin and at the same time acting as city planning advisor to various cities in Germany and South America.

J. D. Craig, who until his retirement in 1931, was Director General of Surveys of the Department of the Interior, Ottawa, and a member of the International Boundary Commission, died in Ottawa on April 3, at the age of 61 years. Mr. Craig was well known in connection with the International Boundary Commission and during 1922-23 established Craig Harbor on Ellesmere Island and Pond Inlet, North Baffin Island, posts of the Royal Canadian Mounted Police. He was chairman of the Ottawa Branch of the Engineering Institute of Canada in 1926.

ROGER D. BLACK, who was retired as a colonel from the Corps of Engineers, and who, until recently, had been acting head of the management branch of the housing division of the PWA, died in New York City on April 12. Colonel Black was 53 years old at the time of his death. Shortly before his death he had been transferred as project engineer on the Ward's Island sewage plant. He was graduated from the U. S. Military Academy, West Point, in 1904 as a second lieutenant, Corps of Engineers. He rose to the grade of colonel in 1918. During the war, he was for a time assistant to the Chief Engineer of the A.E.F. and was later made division engineer. After the war he became attached to the War Plans Division of the General Staff in Washington. He retired in 1919 to enter private practice.

T. L. LEON DE TISSANDIER, county surveyor of Winnebago County for 30 years died April 6 in Rockford, Ill., at the age of 84.

NORMAN W. WARREN, for many years an executive of the Dominion Bridge Co., Ltd., Montreal, died at his home in Berlin, Conn., on April 4 after a year spent in retirement. Born in Kensington, Conn., in 1876, Mr. Warren was later graduated from Yale University, in engineering. His first work was as a draftsman with the American Bridge Co. Later he went to Montreal and in 1911 he joined the National Bridge Co. of which he became chief draftsman in 1912. This company was later absorbed by Dominion Bridge Co., and Mr. Warren became manager of the National Bridge Co., and acting manager of the Dominion Bridge Co. for the west of Canada. In 1916, he was appointed western manager. In 1921 he returned to Montreal to become general manager of Dominion Bridge Co. In 1929 he became vice-president and general manager, holding this position until his resignation last year.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards jumped to $54,756,000 this week due to the award of equipment for steel sheet and strip mills for Jones & Laughlin Steel Co. This total is made up of private, $26,285,000; public, $28,471,000 of which federal is $999,000 and state and municipal, $27,472,000. Corresponding values a year ago are: total, $26,087,000; private, $10,029,000; public, $16,058,000 of which federal is $2,711,000 and state and municipal, $13,347,000.

While the industrial building classification is responsible for most of the increase this week, highways are also higher than last week, as are sewerage, bridges, and earthwork and waterways. The volume of awards under these classifications is: industrial buildings, $23,549,000; public buildings, $5,898,000; commercial buildings, $2,387,000; highways, $10,752,000; bridges, $3,244,000; sewerage, $3,951,000; waterworks, $1,070,000; earthwork, drainage, $2,289,000; unclassified, $1,616,000.

The larger awards for the week lead off with the equipment for the sheet and strip mill at Pittsburgh, Pa., for Jones & Laughlin Steel Co., for which $22,000,000 is included in this week's figures. The balance of the total, $3,000,000 will be added when award is made for the building construction. Other large awards include: building for H. H. Rockham School, University of Michigan, Ann Arbor, Mich., $500,000; senior high school, Nashua, N. H., $541,000; Bronx Industrial High School, New York, N. Y., $887,000; highways, by Iowa, $590,000; by Kansas, $603,000; by South Dakota, $559,000; by Minnesota, $642,000; by New Mexico, $690,000; by Ohio, $756,000; by Montana, $838,000; by Texas, $567,000; bridges, by New York, $848,000; by Virginia, $463,000; trunk sewer lines, Section B & C, Little Rock, Ark., $517,000; trunk line sewers, Section A, Little Rock, Ark., $432,000; generating units for Southwest Sewerage Treatment Works, Div. "O," vapor heater units, Div. "W," Chicago, Ill., $756,000; Detroit River Interceptor, Section 11, Detroit, Mich., $684,000; dike along Susquehanna Ave. for flood prevention, Binghamton, N. Y., $2,000,000.

New capital this week is all from private investment, $10,001,000 in state and municipal bonds and $931,000 in corporate securities for plant improvements.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Apr. 1935	Weekly Average Prev. 4 Weeks	Week Apr. 16 1936
Federal Government	$4,661	$1,173	$999
State and Municipal	13,972	24,248	27,472
Total public	$18,633	$25,421	$28,471
Total private	10,610	9,957	26,285
Week's total	$29,243	$35,378	$54,756

Cumulative to date:
1935...$403,606,000 1936...$731,796,000

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

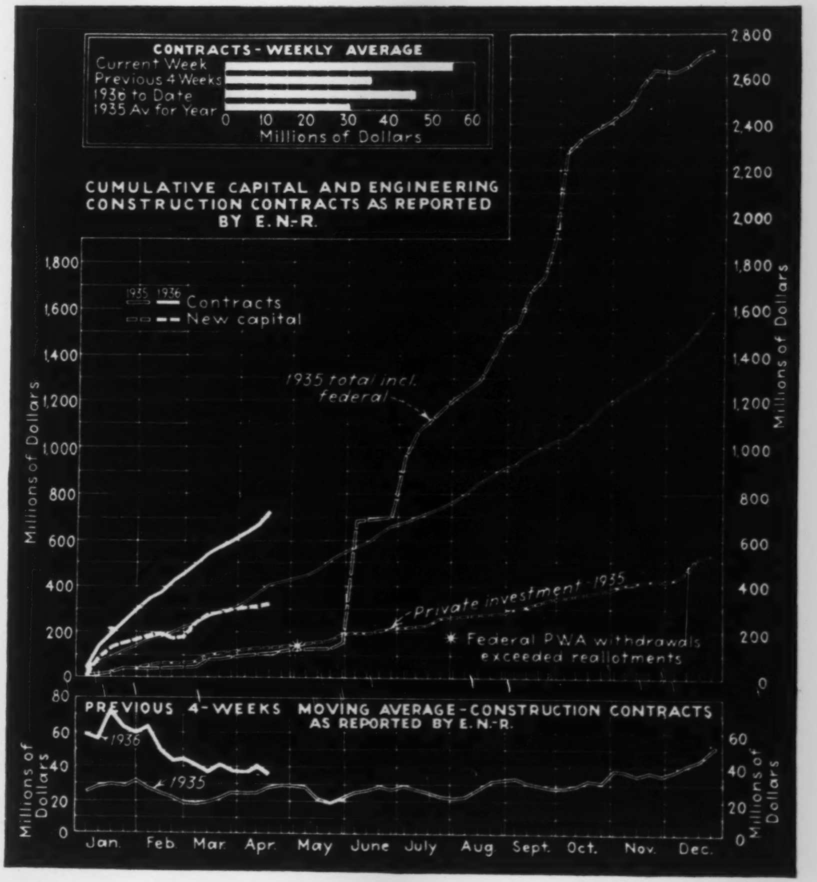
1936	Week Apr. 16	Cumulative
State and municipal....	$10,001	$162,004
PWA non-federal	....	49,644
RFC loans	....	25,000
Corporate issues	931	79,476
PWA loans, Private ..	.....	1,270
Total Non-Federal...	$10,932	$317,394
Federal	....	4,955
Total new capital....	$10,932	$322,349

Cumulative to date:
1935...$103,117,000 1936...$322,349,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

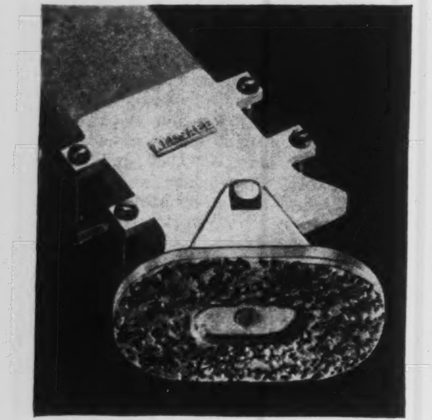
ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Apr., 1936	**202.20**	**97.20**	**Mar., 1936**	**160**	**70**
Mar., 1936	201.20	96.71	Feb., 1936	176	77
Apr., 1935	194.50	93.49	Mar., 1935	101	44
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47



Construction Equipment and Materials

New Ladder Shoe Prevents Skidding

A ladder shoe to provide a firm grip on all surfaces, such as steel, wood, concrete and other types where water, ice and oil accumulate, has been developed by the American Allsafe Co., Inc., Buffalo, N. Y. The shoe is clamped onto the ladder rails by means of a saddle held in place by four bolts. The shoes are self-aligning to assure a solid footing on uneven surfaces and a stop prevents the ladder from being set up at unsafe angles. Into the floor plates of the shoes have been cast carborundum grits to provide a non-skid grip. The shoe and the saddle are made of aluminum alloy.



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Steel Rolling Grilles Protect Openings

Galvanized steel rolling grilles for protecting various sized doorways or openings are made by the Cornell Iron Works, Inc., Long Island City, N. Y. The grilles are made of hard drawn galvanized round steel bars connected by malleable iron links. The grilles are attached to overhead pipe shafts which contain springs to counterbalance their weight. The grilles may be operated by hand or by electric motor.

The rolling grilles lock into channel-shaped side guides at the jambs and will resist considerable pressure.

◆

Remote Control For Hand Valves

To supplement automatic control systems, The Foxboro Co., Foxboro, Mass., has developed the new Remote Hand Control. In many processes, automatic controllers stabilize operation to such an extent that many non-critical flows may be governed by hand valves, which need be readjusted very infrequently. However, if these hand valves are not easily accessible, the few necessary adjustments may be neglected. Where these conditions exist, a Foxboro Remote Hand Control mounted on a centrally-located panel enables the operator to adjust manually the degree of opening of an inaccessible valve without moving from his station. With it, he can reset a valve several hundred feet away to control temperature, pressure, flow or liquid level using readings from his recording instruments to guide him in making the correct adjustments.

With this remote hand control the valve opening can be altered by as little as a few thousandths of an inch. Due to the design, there is no pumping or vibrating.

◆

Vibrator Designed for Concrete Road Joints

A vibrator that can be converted from an internal to an external vibrator in a very short time, and which is operated by a four-cycle air-cooled gasoline engine, has been developed by R. W. Baily, Philadelphia, Pa. This machine with its four vibrating fingers is especially adaptable for vibrating concrete adjacent to transverse and longitudinal joints in highways.

The Baily vibrator consists of a vibrating element, to the bottom of which are attached four fingers which may be immersed in the concrete. The vibrator element is hung below the engine base and separated from it by elastic connections to eliminate the transmission of vibrations. The apparatus weighs 49 lb. and operates at frequencies ranging from 3,600 to 5,000 impulses per minute. For surface vibration, the fingers are removed and replaced by a float pad, 12x24 in. in area.

◆

Developing Machine for Positive Prints

For positive type prints with black, blue or maroon lines against a white background, depending on material used, the Ozalid Corp., New York City, has produced a developing machine with which no negative is required for reproducing prints. By using dry ammonia fumes as the developing agent, no liquids touch the prints at any time, thus eliminating shrinkage of the paper. The type 600 machine will accommodate sensitized paper or cloth of 42 or 54 in. in width. The machine develops at a speed of 18 in. per minute. It weighs approximately 60 lb., is 12 in. high, 10 in. wide, and 10¼ in. longer than the size of the paper or cloth it accommodates.

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New Equipment in Brief

Nickel Alloy Metals. Useful data on nickel alloy steels and nickel cast irons has been assembled in the form of convenient circular charts by the International Nickel Co. Inc., New York City. The nickel alloy steels chart, for bars, casting shafts, ings, and simple forgings, is so designed that one sets the pointer at the desired yield point for any given diameter and then reads from the convenient windows the type of steel, heat treatment, per cent of elongation, per cent of reduction of area, tensile strength and Brinnell hardness. A similar chart enables one to determine the physical properties and corresponding chemical composition for 49 different uses of nickel cast iron.

Handy Pocket Rule. The Mezurall, a 6-ft. steel tape-rule, has been placed on the market by the Lufkin Rule Co., Saginaw, Mich. With it, common measuring, either butt end or hook is done in the usual way. To take an inside measurement, the square back edge of the case is butted against one side of the opening being measured, the blade is extended to the other limit, and 2 in., the width of the case, is added to the reading. The end hook has a short sliding action, automatically adjusting itself to give accurate results when hooked over any object. Like other Lufkin Tape-rules the steel blade will stand unsupported, like a rule; yet also flex, like a tape.

Single Strand Guard. The single strand guard fence made by the Wej-Lock Co., Centralia, Mo., is equipped with end springs of 4 in. compression at 5,000 lb. The cable end, tie bar, turnbuckle and spring cap are cast malleable iron. The end posts are held by expanding anchors.

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New Publications

PIPE LINE AFTERCOOLER, Ingersoll-Rand Co., New York City. 8½x11, 4 pages.

ADAMS ROAD MACHINERY, J. D. Adams Co., Indianapolis, Ind. 8½x11, 14 pages. Condensed catalog.

TYPE "PC" CABINETS FOR AIR CONDITIONING, Buffalo Forge Co., Buffalo, N. Y. 8½x11, 23 pages.

TYPE K SAND PUMP, Morris Machine Works, Baldwinsville, N. Y. 8x10½, 4 pages.

MACWHYTE WIRE LINES FOR DRILLING, Macwhyte Co., Kenosha, Wis. 4¼x6¼, 38 pages.

TECHNICAL COATINGS, Technical Coatings, Inc., New York City. 8½x11, 10 pages.

PRODUCTS OF THE AMERICAN BRAKE SHOE & FOUNDRY CO., American Brake Shoe & Foundry Co., New York City. 8½x11, 32 pages.

PIONEER JAW CRUSHERS, Pioneer Gravel Equipment Mfg. Co., Minneapolis, Minn. 8½x11, 8 pages.

BENJAMIN ELECTRICAL PRODUCTS, Benjamin Electric Mfg. Co., Des Plaines, Ill. 5x6½, 288 pages. Catalog 26.

SERVICE INSTRUCTIONS FOR CAPACITOR-START INDUCTION-RUN MOTORS, Wagner Electric Corp., St. Louis. 8½x11, 4 pages.

MICROMAX SPEED RECORDERS, Leeds & Northrup Co., Philadelphia, Pa. 8x10½, 4 pages.

COST FINDING RECORD BOOK FOR CONVEYOR BELTS, B. F. Goodrich Co., Akron, Ohio.

TWO-STAGE AIR-COOLED PORTABLE COMPRESSORS, Ingersoll-Rand Co., New York City. 8½x11, 28 pages.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

★ **Calif., Pittsburg**—Estimates of cost submitted for water supply reservoir on Kellog Creek, 15 mi. southeast of here to serve city with adequate water supply system. $1,773,000. A. Kempkey, Hobart Bldg., San Francisco, engr.

Calif., San Francisco—Dpt. P. Wks. soon takes bids constructing three 75,000 gal. rein.-con. fire cisterns, Group 5, AWSS for fire protection, 1 at Market and Laguna Sts., 1 at Market St. opposite Gough St. and other at Grove St. and Van Ness Ave. $23,000. P.W.A. project. J. J. Casye, city engr.

Mass., Brookline—Town, D. A. Rollins, chn. Bd. Selectmen, Town Hall, plans 1 story, 23x30 ft., concrete, brick high service emergency pumping station and equipment, Reservoir Rd. $20,000 appropriation. W. B. Bushway, supt. Water Dpt.

Mass., Harvard—Town, W. E. Haskell, chn. Bd. Selectmen, Town Hall, plans replacing concrete dam at Old Hill Rd., washed out by flood. $20,000 to $25,000. E. Maynard, supt. Streets and town engr.

N. H., Conway—Town, N. C. Lovejoy, chn. Bd. Selectmen, Town Hall, plans water distribution system. $40,000. P.W.A. project. **Maturity indefinite.**

N. Y., Brooklyn—New York Water Service Corp., 90 Broad St., New York, will award contract in May or later, constructing water storage tank (from bids submitted from selected list of bidders). T. H. Wiggins, 90 Broad St., New York, engr.

N. Y., Oswego—City, W. A. McCaffrey, supt. Waterworks, plans extending 10,800 ft. mains to Fruit Valley. $50,000. C. H. Snyder, city engr.

N. C., Burlington—City filed application with P.W.A. for loan and grant to finance construction waterworks improvements. $95,909. A. C. Linberg, city engr.

Pa., Mansfield—Town plans installing new water supply system, incl. dam, pump house and filtration plant at Mansfield State Teachers College. $65,000. W. H. Dechant & Sons, 632 Washington St., Reading, engrs.

Pa., Somerset—Boro plans purchasing plant and equipment of Gladehurst Water Co. and plans improvement to plant and extension of facilities if and when plant is acquired.

Que., Lachute—Village Council, J. H. Mason, mayor, soon takes bids inlet pipe to village water supply and dam. Est. about $20,000.

★ **Sask., Moose Jaw**—Municipality making plans 72 mi. wood stave pipe line from near Gilroy to Belbeck, bringing Saskatchewan River water to Moose Jaw. $2,224,000. H. C. Ritchie, City Hall, engr.

BIDS ASKED

†D. C., Wash.—Apr. 23, by U. S. Eng., furnishing, installing testing equipment in MacMillan Pumping Station.

Md., Salisbury — Apr. 20, by Mayor and Council, City Hall, 24 in. well, double casing, Contr. 334-W, Sect. A, 6 in. sand bucket test holes, 24 in. OD well with 12 in. G.W.I. casting inserted, therein, incl. gravel wall between well castings, together with strainer. C. Gardner, Salisbury, acting city engr.

Mass., Barre—Apr. 24 by Commonwealth of Massachusetts, Metropolitan Dist. Comn., R. N. Molt, secy., 20 Somerset St., Boston, constructing ashlar-masonry head house at Shaft 9 of Quabbin Aqueduct in Barre, part of Swift River Reservoir and water supply project. F. E. Winsor, ch. engr.

Mass., Brookline—See "Contracts Awarded."

Mass., Harwich—Apr. 23, by Town, J. W. Crowell, chn. Bd. Selectmen, Town Hall, furnishing, laying 16 mi. c.i. pipe watermains, hydrants, valves, house services, etc., also construct elevated tank, pumping station and furnishing, installing pumping equipment and appurtenances. $260,000. P.W.A. grant $117,000. Whitman & Howard, 89 Broad St., Boston, engrs. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

Mass., Quincy—Apr. 21, by City, E. C. Sargent, comr. P. Wks., City Hall, constructing 2 m.g. steel standpipe, Cranch Hill. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

Mass., Wellesley—See "Contracts Awarded."

N. Y., Albany—Apr. 20, by City, City Hall, steel mesh reinforcement for use at Basin C, Loudonville Reservoir. Bids Mar. 16 rejected. Noted Mar. 27, C. D.

N. Y., New York—Apr. 28, by Bd. Water Supply, 346 Bway., New York, making test borings in Wawarsing, Ulster Co., Contr. 330; and in towns of Gardiner, Plattekill and Marlboro, Ulster Co., and in Newburgh, Wappinger, Fishkill and East Fishkill, Dutchess Co., and Putnam Valley and Kent, Putnam Co., Contr. 331.

N. Y., Rockville Center—Apr. 22, by Village, H. C. Major, comr. Pub. Utilities, Municipal Bldg., furnishing, installing c.i. pipe, fittings and appurtenances for extending waterworks. $28,520. P.W.A. project.

N. Y., Troy—See "Contracts Awarded."

Pa., Springboro—Apr. 24, by Boro Council, constructing waterworks system, incl. well, pump, motor and pump house, watermains, fire hydrants, elevated steel storage tank. K. A. Miller, 548 Baldwin St., Meadville, boro. engr.

Wis., Elkhart Lake—Apr. 22, by Village, furnishing pump, Contr. C; constructing station and reservoir, Contr. D. J. Donohue Eng. Co., Sheboygan, engrs.

†T. H., Aiea—June 3, by Yards & Docks, Navy Dpt., Wash., D. C., water supply system at Naval Reservation, Spec. 8139.

CONTRACTS AWARDED

Calif., Modesto—H. E. Gratt, city clk., furnishing, installing casing, sand pumping and developing well, to Osterberg Bros., Route 4, Box 738. Bids Mar. 27, awarded Mar. 27. Noted Mar. 24, C. D.

Ill., Rock Island—City, improving water filtration plant building, to O. M. Randall Constr. Co., Rock Island, $17,495; filter equipment, to E. W. Bacharach & Co., $9,500. **P.W.A.** Bids Mar. 7. Noted Mar. 3, C. D.

Mass., Brookline—Town, D. A. Rollins, chn. Bd. Selectmen, Town Hall, driven well water system, day labor, under supervision of D. A. Rollins. $12,000 funds appropriated. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

Mass., Dartmouth—Town, W. B. Lewis, chn. Bd. Selectmen, Town Hall, extension c.i. watermains in various streets, day labor under **W.P.A.** Est. about $140,000. J. A. Handy, supt. Water Dpt., Town Hall, engr. Noted Nov. 4, C. D.—Nov. 7, E. N.-R.

Mass., Wellesley—Town, J. T. Ryan, clk., Town Hall, extending c.i. pipe watermains in various streets during 1936, day labor. W. E. Stanwood, Town Hall, P. Wks. Comr.

Mo., Elsberry—City, Contr. A, 150 ft. 10 in. and 300 ft. 8 in. deep well, 150 ft. 8 in. I.D. casing in place and deep well centrifugal pump, to Layne Western Co., B.M.A. Bldg., Kansas City, $2,092***Contr. B, 100,000 gal. steel tank on 100 ft. tower, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill.; $8,300***16,000 ft. 6 in. c.i. main from town to Mississippi River, by W.P.A. forces. **W.P.A.** Bids Mar. 30. Noted Mar. 27, C. D.

Mont., Conrad — State c/o Montana State Water Conservation Bd., Helena, furnishing c.i. pipe, to American Cast Iron Pipe Co., 941 Plymouth Bldg., Minneapolis, about $90,000, labor to Threet Bros., Lovell, Wyo., about $38,000. Bids Nov. 29. Noted Oct. 24, C. D.—Oct. 31, E. N.-R.

Mont., Thompson Falls — City, constructing general improvements to city's gravity water system, incl. relaying watermains in Main St., to McLaughlin Constr. Co., Livingston, $31,519. **P.W.A.** Bids Mar. 23. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Neb., Alvo—City, c.i. pipe and specials for Sects. 2 and 3, for waterworks, to American Mchy. & Supply Co., 1113 Howard St., Omaha, $4,545. **P.W.A,** Bids Feb. 17. Noted Mar. 10, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

Neb., Omaha — Metropolitan Utilties Dist., furnishing, installing complete pumping unit, to Fairbanks Morse & Co., 9th and Harney Sts., $14,048. **P.W.A.**

Neb., Swanton—City, Sects. 6 and 7, tubular well and deep well pump for waterworks improvements, to Layne Western Co., B.M.A. Bldg., Kansas City, Mo., $1,123. **P.W.A.** Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

N. Y., Apalachin—Town of Owego, water supply system, distribution system, pump room, chlorination room, supply chamber with aeration equipment, to Lamacchia & Guadagnino, R.F.D. 2, Hamburg, $44,310. **P.W.A.** Bids Mar. 21. Noted Apr. 6, C. D.—Mar. 26, E. N.-R.

N. Y., Canton—Town, Sect. 3, waterworks distributing mains and sanitary sewer extensions, to W. K. Wilson & Co., Asheville, exceeding $50,000. Total est. $150,909. Town, Apr. 1, Sect. 1, pumping station, filter plant, clear well and reservoir, from A. H. Guion & Co., Kinney Bldg., Charlotte and Wm. Muirhead Constr. Co., Durham. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

N. Y., Hempstead—Town Bd., constructing water distribution system in Uniondale Water Dist., to Karlson & Reed, Inc., Hicksville. **P.W.A.** Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

N. Y., Niagara Falls—City, water intake pipe and crib, incl. 2,210 lin.ft. 55 in. pipe line and appurtenances, Contr. "B," tunnel, to Wright & Kremers, Inc., Main St. and Pine Ave., $159,414. **P.W.A.** Bids Mar. 27. Noted Mar. 31, C. D.—Mar. 19, E. N.-R.

N. Y., St. Regis Falls—St. Regis Falls Water Dist., town of Waverly, A. Forkey, St. Regis Falls, clk., steel water storage reservoir, Unit 1, to Pittsburgh-Des Moines Steel Co., 270 Bway., New York***Unit 2, to Frazza Constr. Co., 62 East 15th St., Paterson, N. J. Est. $116,363. **P.W.A.** Bids Apr. 1. Noted Mar. 12, C. D.—Mar. 19, E. N.-R.

N. Y., Troy—City reconstructing 30 and 32 in. water mains at Tomhannock Reservoir near Spiegeltown, to replace flood damage, own forces. To exceed $23,000.

Tenn., Jackson—City Commissioner, reservoir and aerator, to M. & Q. Constr. Co., Arcade St., Nashville, $88,296***low head pump, for waterworks, to Goulds Pump Co., Seneca Falls, N. Y., $243***high head pump for same, to Fairbanks Morse Co., St. Louis, Mo., $2,224***furnishing, installing water meters and meter boxes, to Curtis Plumbing Co., Jackson, $52,135. Grand total $142,899. Bids Apr. 2. **P.W.A.** Noted Mar. 17, C. D.—Mar. 19, E. N.-R., under "Sewerage and Waste Disposal."

Utah, American Fork—City, furnishing c.i. pipe for waterworks, to Pacific States Cast Iron Pipe Co., Provo, Utah, $5,460***reinforcing steel, to Salt Lake Hardware Co., 105 North 3rd St. W., Salt Lake City, $1,139***cement, to Chipman Mercantile Co., $1,003. Grand total $7,602. **W.P.A.** Caldwell & Richards, Templeton Bldg., engr. Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

Wis., Tigerton — Village, constructing tank and elevated tower, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $7,990. Druar & Milinowski, Globe Bldg., St. Paul, Minn., engrs. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

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Federal Government projects symbol †

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SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Menlo Park — Menlo Park Sanitary Dist., election Apr. 20, $28,000 bonds to finance construction of sewers.

Ill., Collingsville—City plans P.W.A. project, intercepting sewers and sewage treatment works. Caldwell Eng. Co., Jacksonville, engr. Noted Sept. 6, 1934, C. D.—Sept. 13, 1934, E. N.-R.

Mo., Deep Water—City making final plans constructing sewers and disposal plant. $44,000. Project approved by W.P.A. E. T. Archer & Co., 609 New England Bldg., Kansas City, engrs. Noted Sept. 12, 1935, C. D.—Sept. 19, E. N.-R.

N. Y., Binghamton—City, C. A. Harrell, mgr., plans sewer in Brandywine Swamp and diversion of Brandywine Creek. $325,000. Project was temporarily abandoned when P.W.A. refused funds, but recent floods have caused owners to revise project and portion of cost is expected to be furnished by federal emergency relief funds. J. A. Giles, city engr. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Colonie (Sta. West Albany) — Town plans constructing sewerage system and sewage disposal plant. To exceed $250,000. W.P.A. project. Bids will not be received. Work will be done by force account, relief labor, when

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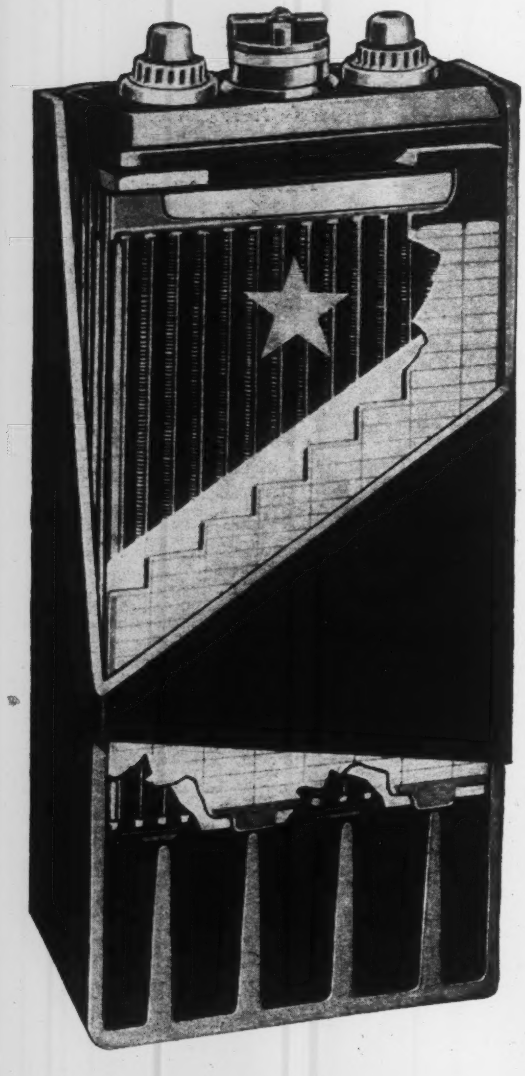

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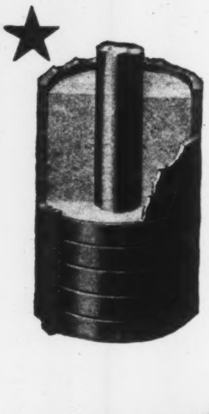

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Sewerage, etc. (Continued)

W.P.A. funds are allotted. $110,000 (excluding cost of materials) will be town's share of cost. Solomon & Keiss, 257 Bway., Troy, engrs. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

N. Y., Elmira—City making surveys extending sewerage project in Hoffman, Clinton, Euclid Sts., etc. To exceed $100,000. Breaks have been discovered in sewer lines, many sewers proved inadequate to handle storm waters after recent floods had receded. P.W.A. project. C. C. Hunter, city mgr., in charge of survey. Remington & Goff, 509 Cooper St., Camden, N. J., engrs.

N. Y., Geneva—City soon takes bids constructing sewage disposal plant to handle sewage from southern section of city, prevented by contour of the land from going through disposal plant just completed. Est. about $25,000, incl. land cost. Common Council authorized Bd. P. Wks. to purchase land at One Mile Point for same. P.W.A. project. J. Brennan, city engr.

N. Y., Utica—City soon takes bids sanitary sewer in Blandina St. between Genesee and Union Sts., 1st portion of sewer construction and replacement program. Total est. exceeds $25,000. J. K. Shaw, city engr.

Pa., Grantley—Spring Garden Twp., York Co., York, W. H. Strine, secy., plans sanitary sewerage system in Grantley section. $25,000 or more. **Maturity indefinite.** Probably W.P.A. project. C. S. Davidson, York, twp. engr.

Tex., San Antonio—Bexar Co. Water Control & Impvt. Dist. 5, c/o L. H. Preston, pres. Bd., South San Antonio, election May 2. $25,000 bonds as its part of financing construction of sanitary sewers and connections. Total est. $275,000.

Wash., Seattle—City, County-City Bldg., rejected bids constructing drainage system on Beacon Ave., from Atlantic to Bay View Sts. $62,311. T. R. Beeman, County-City Bldg., engr.

BIDS ASKED

Conn., Hartford—See "Contracts Awarded."

Md., Crisfield—Apr. 28, by City, constructing sanitary sewerage system. W. H. Bradshaw, mayor. C. Gardner, Salisbury, consult. engr.

Mass., Framingham—See "Contracts Awarded."

Mass., Leominster—Apr. 21, by City, H. J. Lawson, supt. Streets & Sewer Dpt., City Hall, furnishing roof ventilators, valves and appurtenances, venturi sewage meter, copper tubing and adapters, flushing monitor, ventilating fan and ducts, sludge pumps, sludge collecting mechanisms at sewage pumping station, Mechanic St., work under way by day labor. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs.

Mass., Pittsfield — Apr. 21, by City, A. B. Farnham, comr. P. Wks., City Hall, concrete, brick, steel building, electric power transmission lines and control equipment in connection with sewage treatment plant (under construction). To exceed $25,000. P.W.A. project. S. M. Ellsworth, 12 Pearl St., Boston, engr.

Mass., Springfield—See "Contracts Awarded."

Mich., Muskegon—Apr. 21, by City, sewage treatment plant and lift station. $140,000. P.W.A. project. Consoer, Townsend & Quinlan, 205 West Wacker Dr., Chicago, Ill., engrs.

Neb., Omaha—See "Contracts Awarded."

N. Y., Dunkirk—See "Contracts Awarded."

N. Y., Fulton—See "Contracts Awarded."

N. Y., Port Washington — See "Contracts Awarded."

N. Y., Schenectady—See "Contracts Awarded."

N. Y., Watertown—See "Contracts Awarded."

Wash., Seattle—Apr. 23, by Bd. P. Wks., constructing drainage system between Airport Way and 13th Ave. S. from Atlantic St. to Bay View St., to provide for extension of Beacon Ave., incl. 400 ft. 6 in. branch drains, 400 ft. 6 in. special drains, 10,780 ft. 6 and 8 in. special drains, 160 ft. 10 in. sewer pipe, etc. $62,311. T. R. Beeman, County-City Bldg., engr.

Wis., Milwaukee—Apr. 30, by Sewerage Comn., constructing new fertilizer storage bins, conveyor system, track scale and track work for sewage plant extension. $40,000. P.W.A. project. J. L. Ferebee, Milwaukee, ch. engr.

Ont., Cornwall—See "Contracts Awarded."

CONTRACTS AWARDED

★ **Ark., Little Rock**—Secretary Sewer Comn., constructing 24,028 lin.ft. section trunk line sewer and rein.-con. manholes, Sect. B, also 21,667 lin.ft. section trunk line sewer and manholes, Sect. C, to Drainage Constr. Co., El Paso, Tex., $302,343 and $95,207 respectively, est. $350,000 and $110,000 respectively; cleaning out existing sewers, removing and replacing pavements, repairing manholes and pipe joints, Sect. D, to G. C. McEachin Constr. Co., Southern Bldg., $119,890 est. $125,000. Grand total $517,440. Bids Mar. 31. **P.W.A.** H. R. Carter, 2103 Gaines St., engr. Noted Mar. 24, C. D.

Ark., Little Rock — Secretary Sewer Com., constructing 18,000 lin.ft. section trunk line sewer, manholes, river outlet structure, pump station, Sect. A, to Nolan Constr. Co., 14101 Plymouth Ave., Detroit, Mich., $431,505. Est. $450,000. **P.W.A.** Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Calif., Stockton — City Council, extending trunkline sewer, involving 5,225 lin.ft. 4 and 12 in. vitr. clay pipe, fifteen 5 ft. diam. manholes, 14,911 sq.ft. asphaltic pavement, 1 lamphole, to Oakland Sewer Constr. Co., 9915 Walnut St., Oakland, $27,315. **P.W.A.** Bids Mar. 25, awarded Apr. 6. Noted Apr. 3, C. D. —Feb. 27, E. N.-R.

Conn., Hartford—Metropolitan Dist., repairing sewage treatment plant, $42,750; sanitary mains, $70,434, W.P.A. Flood Emergency Project, owner builds, **W.P.A.** labor. City's share of total $20,560. R. N. Clark, mgr. sewer div.

★ **Ill., Chicago** — Sanitary Dist. of Chicago, furnishing, delivering, installing 4 steam generating units for Southwest Sewage Treatment Works, Div. O, to Combustion Eng. Co., 208 South Clark St., $427,063; 4 vapor heater units of high temperature type, Div. W, to Air Preheater Corp., 122 South Michigan Ave., $329,496. **P.W.A.** Bids Mar. 12. Noted Mar. 17, C. D.—Mar. 5, E. N.-R.

Ill., East St. Louis—East Side Levee & Sanitary Dist., S. H. Kernan, pres., 628A Missouri Ave., 14,995 lin.ft. 42- to 54-in. culvert pipe, 1,428 lin.ft. 54 in. extra strength pipe, 280 cu.yd. concrete in manholes, 34 manholes, frames and covers for Lansdowne Sect., East St. Louis, Washington Park and Fairmount City, to G. Locke Tarlton Constr. Co., 3615 Olive St., St. Louis, Mo., $330,790. Bids Apr. 1. **P.W.A.** Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

Ill., Peoria — Greater Peoria Sanitary & Sewerage Disposal Dist., sanitary sewerage system, to H. C. Willadsen, 101 Persimmon St., $189,879. **P.W.A.** Bids Mar. 26. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

Kan., Topeka—City Comn., first section of Country Club Sanitary Sewer, to C. J. McCoy, Emporia, $40,311. Subject to **P.W.A.** approval.

Mass., Framingham—Town, J. J. Brady, chn. Bd. Selectmen, Town Hall, addition to present sewage treatment plant, incl. sludge beds, filters, tanks, etc., day labor under **W.P.A.** Est. $150,000.

Mass., Leominster—See "Bids Asked."

★ **Mass., Springfield**—Bd. Alderman, H. Martens, mayor, plans rebuilding sewers $123,900 hys. $309,800, sidewalks $160,000, curbs $52,800 and dikes $15,000, damaged by floods. Some of work to be done by day labor and some to be let out by contract. Grand total $661,500.

★ **Mich., Detroit**—Dpt. P. Wks., Sect. 11, Jefferson Ave.-Detroit River Interceptor Sewer, to S. A. Healy Co., 6561 East Seven Mile Rd., $684,103. **P.W.A.** Bids Mar. 20, awarded Mar. 9. Noted Mar. 26, C. D.—Mar. 12, E. N.-R.

Minn., St. Paul — Minneapolis-St. Paul Sanitary Dist., 1923 University Ave., St. Paul, constructing interceptor sewers shaft and appurtenances, Contr. 113, Div. F, Job 600, to Northern States Contg. Co., 313 Endicott Bldg., St. Paul, $39,349. **P.W.A.** Bids Apr. 6. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

Neb., Ogallala — City, disposal plant, to Chambers Constr. Co., Lincoln, $28,980. Total est. $35,250. **P.W.A.** Group Eng. Co., Omaha, engrs. Bids Dec. 5.

Neb., Omaha—City, constructing 3 mi. storm sewer along 13th St. from Hoard to Missouri Aves., relief labor. $250,000. **W.P.A.** D. F. McCauley, Bus Bldg., Omaha, engr. Procurement Div. W.P.A., Union Terminal Bldg., Lincoln, will purchase materials.

N. Y., Dunkirk—City, constructing vitr. tile sewers in Plover St. from 3rd to 4th Sts. and from 5th to 6th Sts., relief labor. $25,000. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, procurement officer. W.P.A., will purchase materials.

N. Y., Fulton—City, constructing 1,400 ft. 30 in. storm water sewers in West 1st St., in 2nd Ward and Cedar St., relief labor. $32,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

N. Y., Port Washington—Village, constructing 730 ft. 18 and 24 in. rein.-con. storm water sewers, 5 catch basins, and 6 manholes, relief labor. Est. about $25,000. **W.P.A.** Treas. Dpt. Procurement Div., 76 9th Ave., New York, will purchase materials.

N. Y., Schenectady—City, improving sewage disposal plant, incl. demolishing old frame building, constructing new service building, reconstructing and repairing Imhoff tanks, sludge storage platform and roadways around plant, relief labor. $42,000. **W.P.A.** Owner will purchase materials. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Watertown—City, constructing 1,820 ft. sewer lines in Hamilton and Caldwell Sts. by relief labor. To exceed $20,000. W.P.A. D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

R. I., Burrillville—Middlesex Constr. Co., general contractors, Victory Bldg., Framingham, Mass., sludge collector for sewage disposal plant

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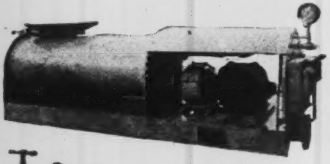

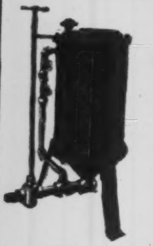

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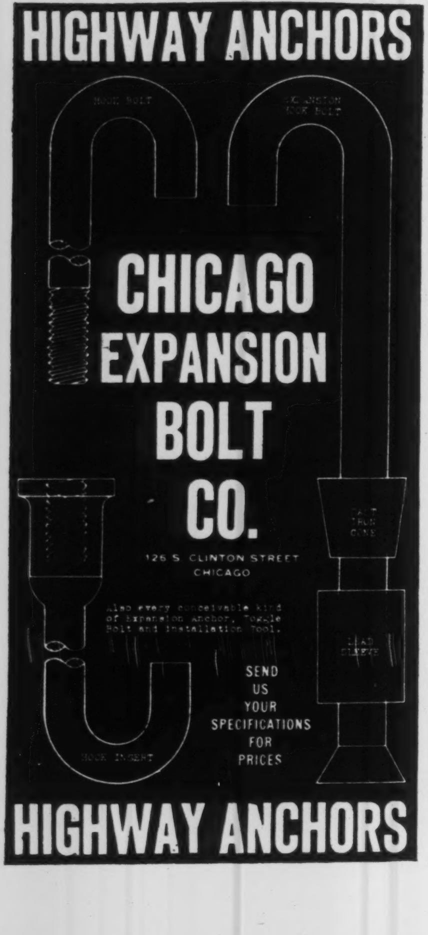

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Sewerage, etc. (Continued)

20 Providence St., Boston, Mass., for State, Emergency, P. Wks. Comn., State Office, Providence; electrical work, to F. Demma, 666 Waverly St., Framingham, Mass. Noted Feb. 5, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

Tex., Houston—City, c/o O. F. Holcombe, mayor, constructing Little White Oak Bayou trunk sanitary sewer, incl. 12,800 ft. 24 in. and 1,225 ft. 36 in., rein.-con. pipe, to Froeming-Kies Co., Inc., Corpus Christi, $94,760, est. $100,000. **P.W.A.** Bids Mar. 18. Noted Mar. 26, C. D.—Feb. 20, E. N.-R.

Wis., Appleton—City, sewage treatment plant, to C. R. Meyer. Oshkosh. **P.W.A.** Bids Mar. 27. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

Man., Winnipeg — Municipality, constructing clarifier reservoir at sewage disposal plant, circular tanks, 115x12 ft., to Carter-Hall-Aldinger Co. Ltd., Winnipeg, $78,760; mechanical equipment, to Manitoba Bridge & Iron Co. Ltd., Winnipeg, $23,640.

Ont., Cornwall—Town, constructing sewers in Montreal Rd. and McConnell Ave., day labor. $28,000. H. Campbell, Cornwall, engr. Noted May 28, C. D.—June 6, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

★ **Conn., Hartford**—State, c/o Hartford County Bridge Comn., B. A. Johnson, chn., Manchester, plans high level bridge over Connecticut River connecting Wawarme Ave., Hartford, and Silver Lane, East Hartford, $4,400,000. No action in 1933 and 1935 Legislatures, to be taken up in 1937 Legislature. Robinson & Steinman, 117 Liberty St., New York, engrs.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 122x24 ft. continuous I-beam bridge on relocation of Primary Rd. 154, Arlington, Fayette Co., incl. 170 cu.yd. Class 1 and 110 cu.yd. Class 2 excav. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing two 40x24 ft. I-beam bridges, incl. 470 cu.yd. Class 1 and 281 cu.yd. Class 2 excav.; one 122x24 ft. continuous I-beam bridge, 180 cu.yd. Class 1, 90 cu.yd. Class 2, 74 cu.yd. channel and 18 cu.yd. rock excav.; one 40x24 ft. I-beam bridge, two 32x24 ft. I-beam span bridge, 420 cu.yd. Class 1, 244 cu.yd. Class 2 and 1 cu.yd. rock excav.; one 50x24 ft. I-beam bridge, 250 cu.yd. Class 1, 172 cu.yd. Class 2, 15 cu.yd. rock and 700 cu.yd. channel excav., on secondary road between Eddyville and Ottumwa, Wapello Co.; moving, re-erecting, cleaning and painting one 150x18 ft. high truss span bridge with I-beam approach spans and 1 rein.-con. box culvert extension, incl. 230 cu.yd. Class 1 and 385 cu. yd. Class 2 excav.; moving, re-erecting, cleaning, painting one 150 ft. high truss span bridge with approach spans on secondary road, south of Rose Hill, Mahaska Co. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, Ia., soon takes bids constructing 150x20 ft. continuous I-beam bridge, incl. 175 cu.yd. Class 1, 87 cu.yd. Class 2 and 400 cu.yd. channel excav. on secondary road, Sect. 33, Garfield Twp. near Hawthorne, Montgomery Co.

★ **Maine**—State Hy. Comn., P. Thurston, chn., L. D. Barrows, ch. engr., Augusta, starting plans bridge construction, to replace bridges recently destroyed by flood, incl. rein.-con., steel repairs to bridge over Kennebec River, Waterville and Windlow; granite pier repairs over Kennebec River, Gardiner and Randolph; replacing 2 spans and piers over Kennebec River, Richmond and Dresden, to exceed $200,000; replacing 2 spans over Androscoggin River, Lewiston and Auburn, to exceed $100,000; rebuilding bridge over Saco River, Buxton; rebuilding 3 span bridge over Saco River, Buxton and Dayton; rebuilding 1 span, structural steel bridge over Saco River, Standish and Limington, $40,000; rebuilding 1 span, steel, concrete bridge over Saco River, Hollis, $10,000; concrete, steel repairs to bridge over Androscoggin River, Rumford, $50,000; rebuilding 1 span, concrete, steel bridge over Saco River, Brownfield, $10,000; replacing with concrete, steel structure bridge over Saco River, Standish, $30,000. Total est. to exceed $750,000.

Maine—State Hy. Comn., P. Thurston, chn., L. D. Barrows, ch. engr., Augusta, plans rebuilding 300 ft. span, rein.-con. and steel Durham Bridge over Androscoggin River, Lisbon, $100,000; 390 ft. span, rein.-con., steel Turner Center Bridge over Androscoggin River, Turner and Greene, $125,000; 1 span bridge over Saco River, Biddeford, $50,000; bridge over Medomak River, Lowell, probably exceeds $40,000; 1 span, rein.-con., steel bridge over Kennebec River, Clinton, to exceed $40,000; 350 ft. span, rein.-con., steel bridge over Saco River, Pine St., Saco and Biddeford, to exceed $100,000; 275 ft. span, rein.-con., steel County Bridge over Saco River, Saco, to exceed $100,000, recently destroyed by flood.

Me., Bingham — Central Maine Power Co., Green St., Augusta,† plans replacing 1 span, rein.-con., structural steel bridge, recently destroyed by flood. Private plans.

Me., Brunswick—Maine Central R.R., W. J. Backes, ch. engr., 222 St. John St., Portland, plans replacing rein.-con., structural steel bridge over Androscoggin River, recently destroyed by flood. Private plans.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, making plans constructing 2 rein.-con. [illegible] structural steel bridges with approaches. $1[illegible],000. W. F. Callahan, comr. G. H. Delano, ch. engr.

Massachusetts — Town of New Braintree, W. E. Loftus, chn. Bd. Selectmen, Town Hall, plans rebuilding, concrete, steel bridge, washed out by flood, at New Braintree, $15,000 or more; town of Townsend, W. A. Green, chn. Bd. Selectmen, Town Hall, plans replacing Lunenburg Rd. Bridge, Townsend, washed out by flood. $15,000 or more.

Massachusetts—Town of Sterling, A. Anderson, chn. Bd. Selectmen, and town of Princeton, H. A. Mason, chn. Bd. Selectmen, plan rebuilding rein.-con. bridge, at town line between Sterling and Princeton, recently destroyed by flood. $30,000. Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, probable engr.

Massachusetts—Town of Upton, P. Robson, chn. Bd. Selectmen, L. B. Marden, co. engr., Court House, Worcester, plans rebuilding 1 span, rein.-con. Vails Bridge, Riverdale Rd., $10,000; Town of Chester, T. Rose, chn. Bd. Selectmen, plans rebuilding 1 span, rein.-con. Bonneyrigg Bridge over Westfield River, $10,000 or more; Town of Adams, H. C. Neff, chn. Bd. Selectmen, plans rebuilding 1 span, steel beam bridge, Line St., $10,000 or more, destroyed by flood.

Mass., Charlton — Town, W. Fay, chn. Bd. Selectmen, Town Hall, plans reconstructing 3 concrete arch bridges, destroyed by flood. Est. about $30,000.

Mass., Dudley—Town, J. N. O'Kane, chn. Bd. Selectmen, plans rebuilding stone and steel bridge, destroyed by flood. $25,000. H. G. Alton, supt. streets.

Mass., Fitchburg—City, J. M. Pierce, comr. P. Wks., City Hall, plans replacing bridges at Westminster St., $10,000; Route 2, $15,000, both rein.-con., washed out by flood.

Mass., Greenfield—Town, D. W. Parkhurst, clk., Town Hall, making plans replacing one span 50 ft. steel beam bridge over Green River, recently damaged by flood. $20,000 to $25,000.

Mass., Holden—Town, W. H. Lowell, chn. Bd. Selectmen, Town Hall, plans reconstructing, probably steel girder, concrete slab and single span type bridges, Millis St., $20,000; Princeton St., $20,000; River St., $20,000; Quinapoxet St., $10,000, destroyed by flood. Engineer not appointed.

Mass., Hudson—Town, E. Morgan, supt. Streets, Town Hall, plans replacing rein.-con., steel bridge over Assebet River, destroyed by flood. To exceed $23,000.

Mass., Montague—New York, New Haven & Hartford R.R., Union Ave., New Haven, Conn., E. E. Oviatt, ch. engr., New Haven, Conn., plans rebuilding rein.-con., structural steel bridge over Connecticut River, destroyed by flood.

Mass., Palmer—Town, J. T. Brown, clk., Town Hall, plans replacing 1 span steel beam bridge over Chicopee River in Thorndike, $25,000; 1 span steel beam bridge over Chicopee River in Bondville, $20,000, damaged by flood.

Mass., Palmer—Town, W. F. Griswold, chn. Bd. Selectmen, Town Hall, plans rebuilding 2 span, steel beam bridge, over Ware River, Palmer Rd., destroyed by flood. To exceed $23,000.

★ **Mass., Springfield**—City, H. Martens, mayor, City Hall, recommended by Commonwealth of Massachusetts, Dpt. P. Wks., to build new 4 span, rein.-con., structural steel bridge to replace present South End Bridge over Connecticut, recently damaged by flood. To exceed $700,000. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

Mo., St. Louis—Streets & Sewers Com., Bd. Aldermen, recommended for passage a bill for extending new express highway from original termination at Vandeventer and Hawks Aves., by constructing 1,200 ft., rein.-con. viaduct, 42 ft. wide, over tracks of Missouri Pacific R.R. $325,000. P.W.A. project; also for constructing 1,600 ft., rein.-con. viaduct, 42 ft. wide, to carry Chippewa St. across Oak Hill branch of Missouri Pacific R.R. $300,000. P.W.A. project; constructing rein.-con. viaduct on Kingshighway Blvd. at intersection with Oak Hill branch of Missouri Pacific R.R. $35,000. City would purchase right-of-way.

New Hampshire — State Hy. Dpt., Concord, plans rebuilding 100 ft. span, steel stringer bridge, Crawford Notch Rd., Bartlett, recently destroyed by flood. $25,000 or more. F. E. Everett, comr. D. H. Dickinson, ch. engr.

N. H., Concord—State Hy. Dpt., Concord, and city of Concord, plan rebuilding Gas House Bridge, consisting of 110 ft. single span, rein.-con., steel, Main St. Est. about $30,000. F. E. Everett, comr. D. H. Dickinson, ch. engr. Noted May 9, 1933, C. D.—May 11, 1933, E. N.-R.

N. Y., Ardsley—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, soon takes bids constructing 5 span rein.-con. viaduct, 40 ft., over railroad tracks (Putnam Division), from Main St., Ardsley, to

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†*Federal Government*

Bridges, etc. (Continued)

Saw Mill River Rd., incl. moving Ardsley Station to east side of tracks, rein.-con. pedestrian tunnel under tracks. To exceed $100,000.

N. Y., Newark—Bd. Supervs. Wayne Co. making plans constructing 50 ft. span bridge on north channel of Ganargua River, Yellow Mills, Walworth Rd. To exceed $23,000.

Ohio—See "Streets and Roads, under Bids Asked."

Pa., Altoona—Blair Co., Hollidaysburg, preparing plans rebuilding steel truss span bridge at 12th St., span at 11th St., 9th St., also foot bridge at Herald St. To exceed $23,000. C. Stout, Co. engr. **Maturity soon.**

Pa., Hollidaysburg—Comrs. Blair Co., J. R. Bassler, Co. controller in charge, plans expending $75,000 for repairs and replacements of hy. bridges throughout the county, damaged or destroyed by flood; also plans expending $18,000 for repairs to flood damaged hys. in county, bituminous materials and cold patch. County Engineering Dpt., Hollidaysburg, engrs.

Vt., Barnet—Canadian Pacific R.R., J. M. R. Fairbairn, ch. engr., Montreal, Que., plans rebuilding rein.-con., structural steel railroad bridge to replace bridge recently destroyed by flood. To exceed $23,000.

Wash., Chehalis—Lewis Co., Courthouse, plans 300 ft. creosoted wood bridge over Bear Creek. $36,000. P.W.A. funds awaited. B. Bantz, Chehalis, engr.

Wisconsin—State Hy. Comn., Madison, rejected bids Apr. 3, constructing Newville Bridge S.T.H. 59, Rock Co., Spring Green Bridge, U. S. and State Hy. 14 and 23, Sauk Co. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

N. B., Bathurst—Province of New Brunswick, Fredericton, A. A. Dysart, minister P. Wks., making plans concrete, steel bridge over Bathurst Basin. $25,000. Dpt. P. Wks., Fredericton, engrs.

★ **N. B., Fredericton**—Canadian National Ry. plans constructing 9 span bridge over St. John River. $1,500,000.

BIDS ASKED

California—Apr. 30, by State Hy. Comn., State Bldg., Los Angeles, constructing steel deck truss bridge with concrete deck, consisting of two 167 ft. 6 in. spans, two 67 ft. cantilever spans and two 30 ft. 6 in. plate girder approach spans across Santa Margarita River, 1½ mi. north of Oceanside, San Diego Co. C. H. Purcell, P. Wks. Bldg., Sacramento, ch. hy. engr.

Calif., Sacramento—Apr. 27, by Supervs. Sacramento Co., constructing 2 concrete bridges and 1 culvert in Howe Ave., involving 286 cu.yd. concrete in abutments, 4.5 cu.yd. concrete in railing, 30,600 lb. reinforcing steel, 150 cu.yd. excav.; also constructing bridge and 2 culverts, El Camino Ave., $6,500. J. Rooney, Court House, co. engr.

Connecticut—See "Streets and Roads."

D. C., Wash.—District Comrs., District Bldg., taking bids constructing Michigan Avenue overpass, incl. 356,000 lb. reinforcing steel, 1,589,500 lb. structural steel, etc. $240,000.

Kansas—See "Streets and Roads."

Louisiana—See "Streets and Roads."

Maine—Apr. 22, by State Hy. Comn., L. D. Barrows, ch. engr., Augusta, McShea Crossing over Bangor and Aroostock R.R., Project 90-B and C, Fort Fairfield, involving 715 cu.yd. rein.-con., 152,600 lb. structural steel and 40,000 cu.yd. fill in approaches; Phair Crossing over Bangor & Aroostock R.R., Project 52, Presque Isle, 593 cu.yd. rein.-con., 67,000 lb. structural steel and 54,000 cu.yd. fill in approaches, total of above exceeds $100,000; Lamson Bridge over Lamson Stream, Project P.W.A. 1014-32, Addison, 270 cu.yd. stone masonry and 133 cu.yd. rein.-con.; Cross Cove Bridge, Jonesport, Project P.W.A. 1014-11, 572 cu.yd. rein.-con. and 106 cu.yd. ashlar masonry, both foregoing to exceed $35,000.

Mass., Leominster—See "Contracts Awarded."

Mass., Springfield—See "Contracts Awarded."

Mass., West Brookfield — See "Contracts Awarded."

Mass., Worcester—See "Contracts Awarded."

Miss., Greenville—See "Streets and Roads."

New York—Apr. 23, by Triborough Bridge Authority, 111 8th Ave., New York, paving streets adjacent to Bronx approach, Bronx connection of Triborough Bridge, connecting Bronx, Manhattan and Queens Boros, Contr. 69; and landscaping between anchorage and 70th St. of Queens connection of Triborough Bridge, Contr. 64.

★ **New York—Apr. 28, by State Dpt. P. Wks., Albany, constructing 24 ft. slab bridge on 0.28 mi. Bridge Rd. SH 268 NRS-986-A, NRS-RC3760, Broome Co. $39,065; 60 ft. and 64 ft. concrete or stone faced concrete arch bridge and two 2 span stone faced concrete arches on Henry Hudson Parkway (Riverdale Ave. Sep.), WPMH 689-J3 ext. HHP-36-1, WPMH-HHP-36-2, Bronx Co. $998,659; eliminating 3 concrete beam spans 105 ft. on 0.54 Cortland-Homer Rd., SH 208-WPGH 233, Homer Village, SH 5058, WPGH RC 3767, RC 2384, Cortland Co. $123,036; 21x10 ft. box culvert on Davenport Center-Oneonta Rd., SH 5455, RC-2382, ER-RC 3762, Delaware Co. $68,622;** constructing 19 ft. slab bridge Culvert 26, Freemans Hollow Rd.; 45 ft. I-beam Bridge 27 on Harrisburg-Hollow Rd., 12 ft. slab Culvert 40, Harrisburg Hollow-Cold Springs Rd., Culvert 47, Seager Rd., 8x6 ft. Box Culvert 48A, Bailey Rd., I-beam Bridge 60, Hickox Rd., and 30 and 40 ft. I-beam Bridge 107, 108 and 109, Cold Springs Rd., WPSO 910-D, WPSO SS-36-28, Steuben Co. $91,889. Total $1,321,271. F. S. Greene, supt.

†*Federal Government*

N. Y., Bath—See "Contracts Awarded."

N. Y., Binghamton—See "Contracts Awarded."

N. Y., Cayuta—Apr. 27, by Lehigh Valley R.R. Co., G. T. Hand, Bethlehem, Pa., constructing steel, concrete grade crossing elimination structure on Apline-Cayuta Hy., Schuyler Co. $105,000. Noted Feb. 14, C. D.—Feb. 22, 1934, E. N.-R.

N. Y., Hopewell Junction—Apr. 20, by New York, New Haven & Hartford R.R. Co., E. E. Ovratt, ch. engr., New Haven, Conn., steel, concrete grade crossing elimination at Carroll and Main Sts. $130,000.

N. Y., Hunter—Bd. Supervs. Greene Co., W. H. Freese, treas., taking bids constructing Slater Bridge, incl. abutments, approaches and sidewalks. To exceed $23,000. R. L. Towner, supt. hys.

North Dakota—See "Streets and Roads."

Pennsylvania—See "Streets and Roads."

South Dakota—See "Streets and Roads."

Virginia—See "Streets and Roads."

Wyoming—See "Streets and Roads."

CONTRACTS AWARDED

Alabama—State Hy. Comn., c/o G. Scott, pres., Montgomery, rein.-con. bridges on 0.075 mi. Collinsville-Ft. Payne Rd., WPH 107 and WPMH 107-1-2, De Kalb Co., to W. F. Scott, Thomasville, Ga., $56,848. Noted Mar. 23, C. D.

Iowa—State Hy. Comn., Ames, to C. W. Boltz, Indianola, 11 rein.-con. pipe and 17 rein.-con. box culverts in Clayton and Delaware Counties, $8,862; 6 corrugated and 1 rein.-con. box culvert extension in Poweshiek Co., $1,264 ***to Wickes Eng. & Constr. Co., 1441 Bluff St., Des Moines, bridge, Marion Co., $26,685 ***to S. C. Anderson, Des Moines, 150x20 ft. continuous I-beam bridge in Davis Co., $11,764; 40x24 ft. skew I-bridge in Hardin Co., $8,160 ***to M. O. Burnet, Marengo, 134x24 ft. continuous I-beam overpass in Iowa Co., $23,596. Grand total $80,331. Bids Mar. 31, awarded Apr. 2. Noted Apr. 6, C. D.—Mar. 26, E. N.-R.

Kansas—State Hy. Comn., at office County Clerk, Kansas City, Bridge 1.2, overpass, continuous I-beam span, P. 30-1-WPGS 476-F, Leavenworth Co., to Carrothers & Crouch, B. M. A. Bldg., Kansas City, $56,757***Bridge 0.9, overpass, continuous I-beam, Project 69-20-WPGH 246 F, Johnson Co., to O. W. Knutson, 3520 Main St., Kansas City, Mo., $28,369. Bids Mar. 24. Noted Mar. 10, C. D.—Mar. 12, E. N.-R., under "Streets and Roads."

Kansas—State Hy. Comn. at office of County Clerk, Wichita **(P. means Project)**, Bridge 2.8, three 14x14 ft. multiple box culvert, P. 81-7-WPMH, 130 DV, Sedgwick Co., to Rhoades Constr. Co., Newton, $19,499***Bridge 12.0, three 8x5x32 ft., rein.-con. beam span, P. WPSO 536 A, Reno Co., to J. H. Shears Sons, Hutchinson, $2,660***Bridge 20.9, three 10x9x32 ft., rein.-con. beam span, P. 4-1G-WPSS 505 B, Rush Co., to A. L. Cook, Ottawa, $3,698 ***Bridge 6.0, three 12x12x32 ft., rein.-con. beam spans, P. 50N-11-FA 134 A, Pawnee Co., to N. Ralph Sanford, Hoisington, $3,138. Grand total $28,995.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., G. H. Delano, ch. engr., 100 Nashua St., Boston, temporary pile timber and structural steel bridge to temporarily replace old bridge recently destroyed by flood over Connecticut River, between Deerfield and Sunderland, to C. J. Maney Co., Inc., 50 Congress St., Boston, approximately $150,000 temporary pile, timber and structural steel bridge to temporarily replace old bridge recently destroyed by flood over Connecticut River, between Montague and Greenfield, to T. Stuart & Son Co., 70 Phillips St., Watertown, approximately $125,000. Noted Apr. 2, C.D.—Apr. 9, E.N.-R.

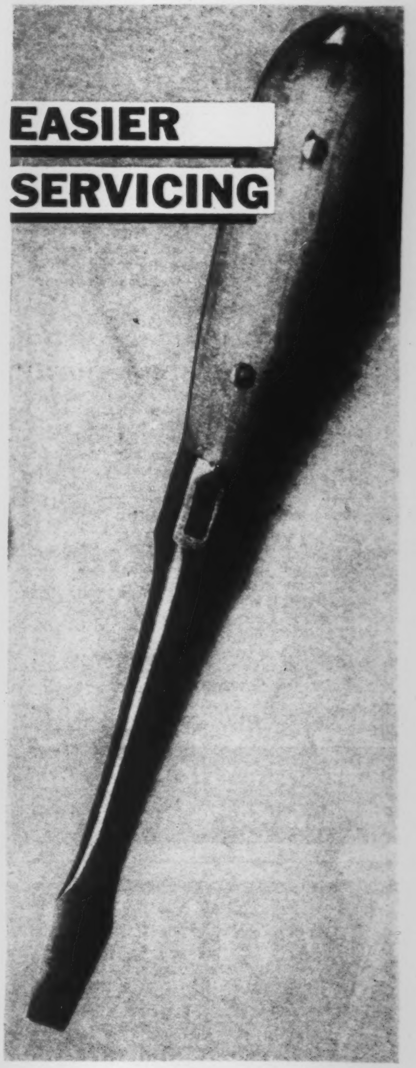
Mass., Arlington—See "Streets and Roads."

Mass., Framingham—See "Streets and Roads."

Mass., Leominster—City, H. J. Lawson, supt. Streets, City Hall, replacing 30 concrete or corrugated iron pipe culverts, damaged by flood, day labor. $30,000.

Mass., Springfield—Comrs. Hampden Co., rebuilding bridges in towns of Palmer and Ludlow, $250,700 and $36,000 respectively, damaged by flood, day labor by towns and cities with State and County Aid.

Mass., West Brookfield—Town, J. W. Clark, supt. Streets, Town Hall, repairs to abutments of 2 stone bridges and reconstructing gravel roads damaged by flood, day labor. $20,000 to $25,000.



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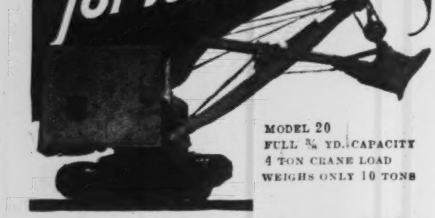

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Bridges, etc. (Continued)

Mass., Worcester — City, E. Jenkins, supt. Streets, R. G. Lingley, city engr., making inspection and preparing estimates repairing abutments and parapet fence of 52 ft. span bridge over Middle River, Webster St., and parapet fence, repairing abutments and replacing steel structures of 50 ft. span bridge Leesville Pond, Webster St.; and replacing abutment of 16 ft. span stone arch bridge, Route 9, Tatnuck Brook, damaged by flood, day labor.

Minnesota—State Hy. Comn., St. Paul, constructing 85 ft. through plate girder underpass, State Project 10-62-24, Bridge 5560, WPGM 558-A, and 0.033 mi. on Dale St., St. Paul, and 137 ft. S.P. 83-83-21, Bridge 5431, WPGS 498-A, 4 mi. south of New Ulm, Brown Co., to McCree & Co., 918 New York Bldg., St. Paul, and to Widdell Co., Mankato, $51,231 and $22,751 respectively***153 ft. Bridge 5443, S.P. 55-142-23-2, WPGM 529-G, in Belgrade, Stearns Co., to Starbuck Constr. Co., Starbuck, $27,368***90 ft. truss spans Bridge 5612, on S.P. 55-142-24-2, WPGM 529-G, in Belgrade, Co., to Pedersen Bros., Montevideo, $21,464*** 123 ft. overhead concrete deck girder bridge, Bridge 5399, S.P. 100-130-23, in Minneapolis, Hennepin Co., to Fielding & Shepley, 814 Guardian Bldg., St. Paul, $38,977***140 ft. Bridge 5400, S.P. 100-130-23, WPGM 540-B, 1.5 mi. east of Minneapolis, Hennepin Co., to J. P. Haley Co., 1954 University Ave., St. Paul, $24,620. Grand total $185,411. Bids Mar. 27. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Missouri—State Hy. Comn., Jefferson City, 2 bridges over Mill Creek, bridge over South Branch Mill Creek, all Laclede Co., rein.-con. culverts on Protem Arkansas Line Rd. and Route D to Ozark Rds., Taney Co., bridges over branch and over Gunter's Creek, Howell Co., to Carte Harlin Constr. Co., West Plains*** subway in Pettis Co., underpass Pettis Co., bridges in Henry and Vernon Counties, to Davis Constr. Co., Boonville***bridges in St. Francois Co. and over Joachim Creek, Jefferson Co., to Porter DeWitt Constr. Co., Kirkwood*** bridge over creek, Johnson Co., to A. W. Mosely, Platte City. Bids Jan. 31 and Mar. 13, C. D. —Mar. 5, E. N.-R.

★ **New York—Dpt. P. Wks.**, Albany, 119 ft. girder bridge in Erie Co., to A. R. Menzies, Kenmore, $72,141 est. $93,147***eliminating grade crossing in Queens Co., to Wilson & English Constr. Co., 50 Church St., New York, $254,221 est. $289,158***85 ft. bridge in Broome Co., to M. E. Colle, Inc., 68 Gilbert St., LeRoy, $46,734 est. $53,724***40 ft. I-beam bridge and approaches in Tompkins Co., to Bero Eng. & Constr. Corp., North Tonawanda, 48,427 est. $60,546***70 ft. girder bridge in Chenango Co., to J. F. Paddelford, Sherburne, $56,404 est. $72,243***bridges in Nassau Co., to C. F. Vachris, Inc., 827 Remsen Ave., Brooklyn, $215,727 est. $251,740***culverts and bridge in Cortland Co., to Wertz Co., Albany, 45,179 est. $54,686***constructing 0.72 mi. road in Dutchess Co., to Spoor Lasher Co., Inc., Prospect St., Poughkeepsie, $108,999 est. $111,-922. Grand total $847,832. Bids Mar. 31. Noted Apr. 6, C. D.—Mar. 19, E.N.-R.

New York—A. A. Volk, Inc., general contractors, 1819 Bway., New York, 625 tons reinforcing steel for Contr. 60, Triborough Bridge, connecting Manhattan, Bronx and Queens Boros, for Triborough Bridge Authority, 111 8th Ave., New York, to Carroll McCreary & Co., Inc., 21-51 Borden Ave., Long Island City. Noted Feb. 18, C.D.—Feb. 20, E.N.-R.

N. Y., Bath—Bd. Supervs. Steuben Co., Bath, constructing and replacing bridges on Wallace-Avoca Hy.; Cunningham Creek Hy., Beeman Hollow and Randallville Hys., destroyed by flood, own forces. Owner will purchase materials. W. G. Kellog, co. supt.

N. Y., Binghamton—City, C. A. Farrell, mgr., City Hall, reinforcing piers of bridges over Susquehanna River, weakened or damaged by recent floods, own forces. $80,000. J. A. Giles, city engr.

N. Y., Binghamton—Bd. Supervs. Broome Co., Binghamton, improving bridges, pavements, dikes, damaged by flood, relief labor. **W.P.A.** A. Calabriso, Telephone Bldg., procurement officer W.P.A. will purchase materials.

N. Y., New York—Boudin Contg. Co., general contractors, 105 West 40th St., 350 tons structural steel for reconstructing bridge carrying West 184th St. (Fordham Rd.), over New York Central R.R. tracks, for Transit Comn., 270 Madison Ave., to Ingalls Iron Wks. Co., 720 4th St., Birmingham, Ala., and Verona, Pa. Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Owego—Bd. Supervs. Tioga Co., repairing bridges, pavements, dikes, etc., damaged by flood, relief labor. **W.P.A.** A. Calabriso, Telephone Bldg., Binghamton, procurement officer W.P.A., will purchase materials.

South Dakota—State Hy. Comn., Pierre, constructing 108 ft. bridge WPH 93, Roswell, Miner Co., and widening 32 ft. bridge, WPH 252, Lake Norden, Hamlin Co., to F. I. Cummins Constr. Co., Sioux Falls, $13,297 and $3,633 respectively***324 ft. overhead crossing, WPGH 172 A, Roscoe, Edmunds Co., to Graves Bros. Constr. Co., Melvin, Ia., $33,079***constructing 9x9 ft., two 10x10 ft. and two 10x5 ft. box culverts, WPSO 408 A and B, Wagner and Avon, Charles Mix and Bon Homme Counties, to Booth & Olson, Inc., 626 Insurance Exchange Bldg., Sioux City, Ia., $10,836. Bids Mar. 31. Grand total $60,845.

Tennessee—State Hy. Dpt., Nashville, constructing overhead and approaches over Southern Railway, Hy. 57, Hardeman Co., to Dade & McDade, Mayfield, Ky., $29,569; overhead and approaches over Southern Railway on Hy. 63, near Pioneer, Campbell Co., to H. B. Garrett, Knoxville, $44,492. Bids Apr. 3. Noted Mar. 24, C. D.—Mar. 26, E. N.-R., under "Streets and Roads."

Texas—G. Gilchrist, state hy. engr., Austin, constructing Gulf, Colorado & Santa Fe R.R. overpass, roadway and approaches Hy. [illegible] Panola Co., to R. C. Buckner, Sacul, $73,[illegible] est. $80,000***G. C. & S. Fe R.R. underpass, approaches and concrete pavement Hy. 36, Burleson Co., to Uvalde Constr. Co., Santa Fe Bldg., Dallas, $43,546 est. $45,000***constructing T. and N. O. R.R. underpass, approaches, drainage structures and concrete pavement, Hy. "F," Brazos Co., to R. B. Butler, Bryan, $[illegible]856 est. $40,000***I. and G. N. R.R. underpass and roadway approaches, concrete pavement Hy. 2, Medina Co., to H. B. Zachry, Laredo, $[illegible]923 est. $80,000***F. W. and R. G. R.R. overpass, approaches and one multiple box culvert Hy. 23, W.P.G.H. 584-E, McCulloch Co., to Cage Bros. & J. C. Ruby, Bishop, $35,893 est. $40,000. Grand total $273,678. Bids Mar. 18. New **P.W.A.** Noted Mar. 25, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing G. C. and S. Fe R.R. overpass and approaches on Hy. 105, Montgomery Co., to R. C. Buckner, Sacul, $48,107 est. $55,000 ***constructing Gulf, Colorado & Santa Fe R.R. underpass and approaches, Hy. 7, Coleman Co., to Austin Bridge Co., 1813 Clarence St., Dallas, $37,488 est. $40,000***constructing G. C. and S. Fe R.R. overpass and roadway approaches, Hy. 67, Bosque Co., to Allhands & Davis, Southwestern Life Bldg., Dallas, $40,956 est. $40,000 ***constructing B. S. L. and W. R.R. overpass and approaches, Hy. "F," Liberty Co., to Russ Mitchell, Inc., 2701 Texas St., Houston, $59,-217 est. $60,000***constructing 4 rein.-con. bridges on Hy. 35, Brazoria Co., to Brown & Root, Inc., 708 Colorado St., Austin, $67,017 est. $70,000. Grand total $252,785. Bids Mar. 17. New **P.W.A.** Noted Mar. 25, C. D.

★ **Virginia—Dpt. Hys., Richmond**, constructing 0.6 mi. underpass, Wise Co., to C. D. and C. P. Fugate, Wise, $15,667***underpass Southern R.R. Warren Co., to Echols Bros., Inc., Staunton, $32,749***0.9 mi. overhead crossing, Page Co., to M. Cain Co., 3315 8th Ave. N. E., Wash., D. C., $26,739***Roanoke overhead crossing, Roanoke Co., to T. A. Loving & Co., Goldsboro, N. C., $193,981***Washington St. Underpass, Petersburg Co., to Hankins, Potter & Dowell, Richmond, $16,568***34th St. overhead, Newport News Co., to Haley, Chisholm & Morris, Inc., Charlottesville, $144,188***new river bridge at Radford, Montgomery Co., to A. N. Campbell & Co., Inc., Lynchburg, $32,863. Grand total, $462,755. Bids Mar. 31.

Wisconsin—State Hy. Comn., Madison, to F. L. Maloney, Rhinelander, constructing Turtle Creek Bridge, Rock Co., $1,079; 22nd St. Bridge, Manitowoc Co., $1,223; Kewaunee Bridge, Kewaunee Co., $2,332; Cornell Bridge, Chippewa Co., $2,710; Brule River Bridge, Florence Co., $304; Center Ave. Bridge, Lincoln Co., $1,923. Grand total $9,571. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

STREETS AND ROADS

BIDS ASKED

Arizona—Apr. 28, by State Hy. Comn., Phoenix, grading, draining, oiling 3 mi. Holbrook-St. Johns Hy. 40 mi. southeast of Holbrook and extending toward St. Johns, Apache Co. $113,000. T. S. O'Connell, Phoenix, engr.

Arizona—Apr. 28, by State Hy. Comn., Phoenix, grading, draining 3.9 mi. U. S. Hy. 80, Pinal Co. $120,000. T. S. O'Connell, Phoenix, engr.

Arkansas—State Hy. Dpt., Little Rock, received no bids Apr. 1, grading, drainage, traffic service graveling 8.3 mi. Sebastian Co., $80,-000; and grading, drainage and bituminous on gravel surfacing 2.4 mi. Benton Co., $40,000. W. W. Zass, 316 Fern St., Little Rock, engr.

California—Apr. 29, by State Hy. Comn., Sacramento, applying road-mix surface treatment to existing roadbed, 27.6 mi. hy. between Temecula River bridge and south boundary and between Sage and point 4.2 mi. south of Hemet, Riverside Co. C. H. Purcell, P. Wks. Bldg., Sacramento, ch. hy. engr.

Connecticut—Apr. 20, by State Hy. Dpt., J. A. Macdonald, comr., Hartford, waterbound macadam paving 3,898 ft. Butt's Bridge Rd. and rolled bank run gravel surfacing 28,776 ft. Water St., Lisbon, Brooklyn and Miller Rds., Canterbury. To exceed $25,000.

Connecticut—Apr. 20, by State Hy. Comn., J. A. Macdonald, state hy. comr., Hartford, grading, draining 22,941 ft. Merritt Parkway, Stamford. Noted Mar. 31, C. D. — Apr. 9, E. N.-R.

Connecticut—Apr. 20, by State Hy. Comn., J. A. Macdonald, state hy. comr., Hartford, concrete paving 18,559 ft. Cheshire-Milldale Rd., Cheshire and Southington; 6,429 ft. Highland Ave., Cheshire; 5,103 ft. White St., Danbury; 3,950 ft. Route 8, Seymour; waterbound macadam paving 2,513 ft. Richards St., Newington; waterbound macadam paving 3,898 ft. Butt's Bridge Rd., and rolled bank run gravel surfacing 28,776 ft. Lisbon, Miller and Brook-

†*Federal Government*

Streets and Roads (Continued)

lyn Rds. and Water St., Canterbury; gravel surfacing 600 ft. Willimantic-Windham Center Rd., and rein.-con. paving 180 ft. Willimantic-North Windham Rd., also 20 ft. span concrete slab bridge, Stamford. To exceed $25,000.

Conn., Hartford—See "Contracts Awarded."

Conn., Stratford—See "Contracts Awarded."

Indiana—Apr. 21, by State Hy. Comn., Indianapolis, constructing rein.-con. and rock asphalt paving 2.911 mi. State Rd. 67, and 1.654 mi. State Rd. 35, Madison St., in Muncie, Delaware Co.; grading, small structures 9.815 mi. State Rd. 67, southwest of Chesterfield, to point 5 mi. east of Daleville, Madison and Delaware Counties. M. R. Keefe, state hy. engr.

Ia., Algona—Apr. 23, by Kossuth Co., E. J. Butler, aud., grading 52 mi. local roads, incl. 370,000 cu.yd. earth excav. H. M. Smith, co. engr.

Ia., Allison—Apr. 21, by Butler Co., G. W. Hesalroad, aud., grading 17.25 mi. road, incl. 192,600 cu.yd. Class 2A and 3,000 cu.yd. Class 2 excav.; 16.25 mi. road, 123,800 cu.yd. Class 2A and 2,600 cu.yd. Class 2 excav.; 14.75 mi. road, 110,600 cu.yd. Class 2A and 6,200 cu.yd. Class 2 excav. O. W. Zack, co. engr.

Kansas—State Hy. Comn. at office County Clerk, Wichita, rejected bids Mar. 27, earthwork and culverts 8.916 mi. Project WPSO 536 A, and 0.523 mi. Project WPMS 536 A, both Reno Co. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Kansas—Apr. 24, by State Hy Comn. at office County Clerk, Marion, earthwork, culverts, light type surfacing, concrete paving, resurfacing, crushed stone for cover material, 37.813 mi. hys. in Clay, Cloud, Dickinson, Marion, Washington, and McPherson Counties; also channel change and constructing jetty, Project 81-23, FA 186-A, Cloud Co.

Kansas—Apr. 25, by State Hy. Comn., at office County Clerk, Lawrence, earthwork, culverts, concrete paving, bridging 1.799 mi. hys. in Jackson, Lyon, and Douglas Counties.

Kansas—Apr. 28, by State Hy. Comn., at office of County Clerk, Ashland, earthwork, bridging, concrete paving, culverts, sand gravel and light type surfacing, resurfacing, sand graveling for cover material 276.301 mi. hys. in Clark, Gray, Kearny, Stanton, Wichita, Hamilton, Finney, Haskell, Ford, Hodgeman, Scott, Lane, Meade, Morton and Ness Counties.

Kansas—Apr. 30, by State Hy. Comn., at office County Clerk, Anthony, earthwork, culverts, viaduct, sand clay surfacing 20.239 mi. hys. in Edward, Harper and Reno Counties.

Louisiana—State Hy. Comn., Baton Rouge, rejected bids Feb. 19, grading, gravel surfacing 6 mi. Pine Grove-Intersection Route 506 Hy., Route C-1436, Project 1148, St. Helena Parish. Noted Feb. 27, C. D.—Feb. 13, E. N.-R.

Louisiana — Apr. 29, by State Hy. Comn., Baton Rouge, grading, gravel surfacing 5.968 mi. Chinchuba-Madisonville Hy., Routes 465 and 188, Project 960-B, St. Tammany Parish.

Louisiana—State Hy. Comn., Baton Rouge, rejected bids Jan. 22, grading, gravel surfacing 2.971 mi. Carrollton-Pleasant Valley Church Hy., Route C-1424, Project 1120, Ouachita Parish. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, rejected bids Jan. 29, grading, gravel surfacing 5.5 mi. Stay-Route 1, Hy. Route C-1426, Project 1124, Grant Parish. Noted Feb. 10, C. D.—Jan. 16, E. N.-R.

Louisiana — Apr. 22, by State Hy. Comn., Baton Rouge, gravel surfacing 14.247 mi. Intersection Route 931 Hy., Route 42, Project 970 D, Cameron Parish; grading, gravel surfacing 5.67 mi. Bayou-Macon Route 16 Hy. and laterals, Project 1168, in Franklin Parish; 1.661 mi. Intersection Route 4—Highland Hy., Route C-1499, Project 1176, Ouachita Parish; Missouri Pacific R.R. overpass and approaches, 12 rein.-con. deck girder approach spans, each 34 ft. 9 in. long and one I-beam span, 44 ft. long, rein.-con. bents, concrete piling founds., etc., on Monroe-Alexandria Hy., Route 14, State Project 3150, Grant Parish.

Massachusetts—Apr. 21 (extended date), by Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston. Type "E" bituminous concrete pavement on 20,810 sq.yd. of either bituminous macadam or penolothic type roadway base and 4,235 sq.yd. bituminous macadam or penolithic type sidewalk base course, also 8,320 sq.yd. granite block pavement, stone masonry and concrete culvert on Ocean Ave. in Revere. Noted Apr. 1, C. D.—Apr. 9, E. N.-R.

Mass., Arlington—See "Contracts Awarded."

Mass., Framingham—See "Contracts Awarded."

Mass., Newton—City, C. A. Mahoney, Street Comr., City Hall, taking bids concrete sidewalks, $15,000; coal tar sidewalks, $15,000, on various streets.

Mass., Springfield—See "Contracts Awarded."

Mass., Sterling—See "Contracts Awarded."

Mass., Webster—See "Contracts Awarded."

Mass., Worcester—See "Contracts Awarded."

Miss., Greenville—Apr. 23, by Washington Co. Hy. Comn., at office of Secretary, Weinberg Bldg., grading, drainage structures, bridges and gravel surfacing 4.4666 mi. Stoneville-Metcalfe Rd., Docket 1307, Sect. PWC 1307-11, $42,103. G. W. Vinzant, Greenville, engr.

Nevada—Apr. 23, by State Hy. Comn., Carson City, surfacing 7.44 mi. Sects. A, A-2, A-3, between 0.6 mi. southeast of Brown's (Geiger Grade), Storey and Washoe Counties. R. A. Allen, state. hy. engr.

New York—Apr. 28, by State Dpt. P. Wks., Albany, roadside improvement New Lebanon-Brainard Rd. SH 615, and Pittsfield-New Lebanon Rd. SH 4, WPH-RC-3761, Columbia Co., $31,586***graveling 6.25 mi. Hawthorne Hill Rd., WPSO 874-A, Herkimer Co.***6.57 mi. Starkville-Hessville Rd. and Salt Springville-Rex Rd., Montgomery Co.; 0.96 mi. Carmel-Kent Rd. and Kent Towner Rd., Putnam Co., $114,333.

N. Y., Albion—See "Contracts Awarded."

N. Y., Binghamton—See "Contracts Awarded."

N. Y., Black Brook—See "Contracts Awarded."

N. Y., Brushton—See "Contracts Awarded."

N. Y., Cheektowaga—See "Contracts Awarded."

N. Y., Chili and Wheatland—See "Contracts Awarded."

N. Y., Eastchester—See "Contracts Awarded."

N. Y., Herkimer—See "Contracts Awarded."

N. Y., Kingston—See "Contracts Awarded."

N. Y., Lancaster—See "Contracts Awarded."

N. Y., New York—Apr. 21, by S. Levy, pres. Manhattan Boro, Municipal Bldg., sheet asphalt on concrete paving East 17th and Beak Sts.; granite block paving when and where directed.

N. Y., Orchard Park — See "Contracts Awarded."

N. Y., Rochester—See "Contracts Awarded."

N. Y., Rome—See "Contracts Awarded."

N. Y., White Plains — See "Contracts Awarded."

North Dakota—Apr. 24, by State Hy. Comn., Bismark, grading 14.192 mi. state highway Dawson East, Unit 1 and 2, WPH 306B, Kidder Co., incl. 74,799 cu.yd. excav.; 6.62 mi. New Rockford South Rd., WPGH 103, WPGH 8, WPGM 8, Eddy Co., 206,828 cu.yd. unclassified excav.; 5.975 mi. Petersburg East Rd., WPH 146, WPMH 146, and WPH 349A, Nelson Co., 88,233 cu.yd. unclassified excav.; 7.918 mi. Medina West, WPH 306C, WPH 306E, Stutsman Co., 134,072 cu.yd. earth excav.; 5.569 mi. state highway east of Bismarck, Burleigh Co., 114,469 cu.yd. excav.; graveling 6.538 mi. southeast of Selfridge, NRH 532, Sioux Co.; 0.568 mi. east of Petersburg, WPGH 146, Unit 3, Nelson Co.; 8.006 mi. Detory Carrington Rd. West, WPH 101, Foster Co., 12.281 mi. Amidon Rd. East, WPH 220C, WPMH 220D, Slope Co.; landscaping 0.462 mi. state highway in Minot, Ward Co.; overhead structures and approaches 0.568 mi. near Surrey, WPGH 81, Ward Co., incl. 77,246 cu.yd. unclassified excav.; overhead structure and approaches on 45 mi. road in Rogers, WPGM 36D, Barnes Co., 69,612 cu.yd. excav. W. H. Flannigan, state hy. comr.

Ohio—J. J. Jaster, Jr., State Hy. Dir., Columbus, received no bids Mar. 31, brick paving 1.285 mi. Scioto Co., $105,163; reconstructing existing separated crossing, D. T. & I. R.R. Co. grading, drainage structures 0.022 mi. Clark Co., $9,387.

Pennsylvania — Apr. 24, at office W. Van Dyke, secy. Hys., Harrisburg, bituminous surfacing on native stone or modified crushed aggregate paving 2 rein.-con. structures 20,328 ft. Route 705, Parks and Bethel Twps., Armstrong Co., involving 165,562 cu.yd. Class 1 and 919 cu.yd. Class 2 excav.; grading, drainage 7,419 ft. Route 49040, Sect. 1, and Route 49042, Sect. 1, Upper Augusta Twp., Northumberland Co., 9,609 cu.yd. Class 1 and 522 cu.yd. Class 2 excav.; bituminous on native stone or crushed aggregate paving 1,902 ft. Route 755, Sect. 3, Ringtown Borough, Schuylkill Co., 714 cu.yd. Class 1, 15 cu.yd. Class 2 and 7,920 cu.yd. borrow excav.; plate girder underpass bridge, rein.-con. paving, etc., 6,850 ft. Route 168, Sect. 4, Paradise Twp., Mt. Pocono Borough, Monroe Co., 41,881 cu.yd. Class 1, 581 cu.yd. Class 2 and 75,659 cu.yd. borrow excav. for hy., 4,274 cu.yd. Class 1, 1,161 cu.yd. Class 2 and 232,555 cu.yd. borrow excav. for roadbed for railroad tracks; encased I-beam underpass, bituminous on native stone or modified crushed aggregate surfacing 5,650 ft. Route 259, Sect. 1, Liberty Twp., Montour Co., 12,728 cu.yd. Class 1 and 2,479 cu.yd. Class 2 excav.

Pa., Tyrone—See "Contracts Awarded."

Tex., Gilmer—City taking bids 7 in. rein.-con. paving, 2 in. asphalt top on grey base, curbing, gutters, 70,000 sq.yd. business and residential streets. $175,000. Hawley, Freese & Nichols, Capps Bldg., Fort Worth, engrs.

Virginia—Apr. 21, by Dpt. Hys., Richmond, **(R means Route and P means Project)** bituminous macadam surface treatment 0.2 mi. R. 220, P. 118, Franklin Co.; 0.2 mi. R. 19, P. 1021, Bluefield Co.; 0.1 mi. R. 23, P. 195, Wise Co.; 0.19 mi. R. 302, P. 1372, Charlottesville Co.; bituminous macadam surfacing 0.3 mi. R. 23, P. 513, Big Stone Gap Co.; 0.2 mi. R. 15, P. 1045, Orange Co.; 4.1 mi. R. 4, P. 1081, Rockingham Co.; 2.3 mi. R. 16, P. 1119, Madison Co.; 0.3 mi. R. 84, P. 1308, Richlands

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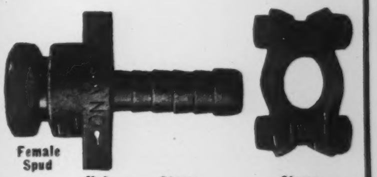

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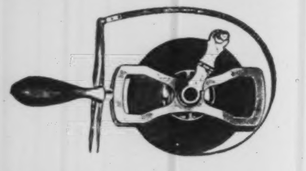

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Streets and Roads (Continued)

Co.; curbing and guttering 0.7 mi. R. 501, P. 592, Buena Vista Co.; bituminous surfacing 0.6 mi. R. 29, P. 1380, Culpeper Co.; bituminous surface treatment, graveling 0.08 mi. R. 12, P. 676, Luray Co.; rein.-con. paving 0.075 mi. R. 460, P. 1037, Suffolk Co.; 0.05 mi. R. 169, P. 1048, Phoebus Co.; soil bituminous surfacing 0.19 mi. R. 40, P. 1050, Nottoway Co.; 0.2 mi. R. 103, P. 1116, Patrick Co.; bituminous macadam surfacing and constructing bridge 0.89 mi. R. 4, P. 1081F, Rockingham Co.; 2.2 mi. R. 29, P. 1091, Nelson Co.; soil bituminous surfacing and constructing bridge 0.2 mi. R. 158, P. 1077.

†Virginia—Apr. 23, by Pub. Rds., Dpt. Agriculture, Wash., D. C., scarifying existing road, applying asphalt emulsion and hot surface treating 4.6 mi. Project 2A2, Fredericksburg and Spotsylvania County Battlefields, Memorial National Park, Spotsylvania Co. H. J. Spelman, dist. engr.

Wyoming — Apr. 23, by State Hy. Comn., Cheyenne, grading, draining, constructing 3 treated timber bridges and 1 rein.-con. culvert 1.543 mi. Jackson Big Piney Rd. WPH 50, Sublette Co., incl. 83,500 cu.yd. excav.; grading, draining, base course surfacing, constructing 1 treated timber bridge and 1 rein.-con. culvert 4.72 mi. Garland Byron Rd. WPSO 279-A, Park Co., 89,000 cu.yd. excav.

CONTRACTS AWARDED

Arkansas—State Hy. Dpt., Little Rock, grading, drainage, traffic service gravel surfacing 10.5 mi. De Witt Co., to D. F. Jones Constr. Co., Pyramid Life Bldg., Little Rock, $48,955 est. $60,000***6.6 mi. Pope Co., to Grady Smith Constr. Co., Locksburg, $26,691 est. $40,000***grading, drainage, bituminous waterbound macadam surfacing 1.9 mi. Pulaski Co., to B. M. Hogan Constr. Co., 115 North Spring St., Little Rock, $42,274 est. $40,000***grading, drainage traffic service gravel surfacing 7.5 mi. Yarbro East Rd., Yarbro Co., and grading, drainage, bituminous paving 0.381 mi. Perry Co., to A. D. Brown, Texarkana, $28,575 and $22,802 respectively, est. $40,000 each. Grand total $169,297. Bids Apr. 1. Noted Mar. 30, C. D.

Connecticut — J. A. Macdonald, state hy. comr., Hartford, loose gravel surfacing 28,583 ft. Three Mile Hill, Oxford and Shadduck Rds., Middlebury, and waterbound macadam paving 17,046 ft. Waterbury and Cook Rds., Prospect, to C. W. Blakeslee & Sons, 58 Waverly St., New Haven, $45,161 and $43,986 respectively ***loose gravel surfacing 4,158 ft. Bennett's Farm Rd., Ridgefield, to John Pascone & Sons, Inc., 73 Steuben St., Bridgeport, $8,995*** rolled bank run gravel surfacing 27,901 ft. 4 sections town aid road, Vernon, to Frank Palazzi & Sons, Inc., Johnston, R. I., $45,649 ***bituminous macadam paving 3,172 ft. White Oak Ave., Plainville, to T. Zolli, 1 Eno Ave., Torrington, $19,847***loose gravel surfacing 35,640 ft. 5 sections town aid road, New Milford, to Oneglia & Gervasini, Inc., Gasson Ave., Torrington, $58,224. Grand total $221,862. Bids Mar. 11. Noted Mar. 13, C. D.

Conn., Hartford — City, repairing 63 streets damaged by flood water, **W.P.A.** labor. Est. $54,908. R. A. Hurley, Hartford, W.P.A. engr.

Conn., Stratford—City, constructing and repairing sidewalks in all sections of town, W.P.A. labor. $97,551. **W.P.A.** W. Dunbar, Town **Hall, engr.**

Ill., Decatur—City, to Birt & Driscoll, Decatur, sheet asphalt paving 0.4091 mi. Sect. 10-1-CS, $18,048; 0.7449 mi. Sect. 10-2-CS, $36,295; 0.2236 mi. Sect. 1-3-CS, $18,093. Grand total $72,436. Bids Nov. 12. Noted Nov. 4, C. D.—Nov. 7, E. N.-R.

Indiana — State Hy. Comn., Indianapolis, rein.-con. paving 5.194 mi. Gibson Co., to Gast Constr. Co., Warsaw, $63,566. Est. $79,722. Bids Jan. 7. Noted Jan. 2, C. D.

★ **Iowa** — State Hy. Comn., Ames, to J. S. McLaughlin & Sons, 300 Liberty Blvd., Des Moines, paving 8.258 mi. Clayton and Delaware Counties, $215,751; 0.27 mi. Johnson Co., $15,240; 0.411 mi. Johnson Co., $28,113; 5.249 mi. Osceola Co., $130,711***to Haegg Constr. Co., Cedar Rapids, 0.316 mi. Delaware Co., $23,637***to J. P. Abramson Constr. Co., 706 Hubbell Bldg., Des Moines, 0.71 mi. Monroe Co., $53,678***to Dzaboff & Wallis, Dubuque, grading 0.265 mi. Black Hawk Co., $10,397 ***to Green Constr. Co., 1201 Capitol Theatre Bldg., Des Moines, 0.555 mi. Franklin Co., $10,125***to E. A. Kramme Co., Inc., Des Moines, 0.321 mi. Franklin and Wright Counties, $10,272***to Sears Constr. Co., Clear Lake, 0.227 mi. Hardin Co., $8,571; 0.249 mi. Hardin Co., $10,010***to L. H. Holscher, Marengo, 0.747 mi. Keokuk Co., $7,140; 0.488 mi. Keokuk Co., $6,617***to W. G. Haynes, Muscatine, 0.303 mi. Marion Co., $8,881***to Burch Constr. Co., Cedar Rapids, 0.586 mi. Monroe Co., $19,148 ***to V. F. Lundeen, Montezuma, 3.518 mi. Poweshiek Co., $6,585***to Kelley Constr. Co., Des Moines, graveling 2.5 mi. Cass Co., $2,910; 3.5 mi. Fremont Co., $5,103***to Sargent Bros., Des Moines, 4.689 mi. Keokuk Co., $7,052; 0.747 mi. Keokuk Co., $1,124; 0.488 mi. Keokuk Co., $666***to Southwestern Constr. Co., Red Oak, 3 mi. Page Co., $3,492***to Concrete Materials Co., Waterloo, 3.518 mi. Poweshiek Co., $5,698. Grand total $590,021. Bids Mar. 31. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

★ **Kansas**—State Hy. Comn., at office of County Clerk, Kansas City, **(P. means Project)**, to M. W. Watson, National Bank of Topeka Bldg., Topeka, bituminous material surfacing 1.0 mi. P. 50N-34-WPH 410-D, $2,618; 3.5 m P. 50N-34-WPH 410 E, $9,173; 7.949 m P. 50N-34-WPH 410F, $21,469, all foregoi Douglas Co.; 6.839 mi. P. 50N-31-WPH 266 $15,054; 4.053 mi. P. 50N-32-WPH 266 C, $1 471; 7.1 mi. P. 50N-33-WPH 410 B, $18,80 3.024 mi. P. 50N-33-WPH 410 C, $7,85 4.137 mi. P. 50N-32-WPH 266 A, Part 1, $1 774; 0.683 mi. P. 50N-32-WPMH 266 A, Pa 2, $1,993, all foregoing in Osage Co.; 5.82 m P. 24-13-WPH 268 A, $15,928; 0.311 mi. 24-13-WPMH 268 A, $717, both Jefferson ***to Joyce-Logan Constr. Co., City Bank Bld Kansas City, Mo., 1.086 mi. P. 36-26-WPH 18 A, $3,134; 3.283 mi. P. 36-26-WPH 319 $9,477; 5.482 mi. P. 36-26-WPH 319 E, $15 787; 0.912 mi. P. 36-26-WPH 319 H, $2,62 all foregoing in Marshall Co.***to San O Constr. Co., McPherson, 3.754 mi. P. 9-27-WP 320 B, Part 1, $10,022; 0.153 mi. P. 27-WPM 320 B, Part 2, $409, both Jackson Co.; 5.9 mi. P. 9-25-WPH 320-A, Part 1, $15,845; 0.5 mi. P. 9-25-WPMH 320 A, Part 2, $1,41 1.456 mi. P. 9-25-WPMH 320 G, Part 1, $3,88 0.532 mi. P. 9-25-WPMH 320 G, Part 2, $1,63 0.103 mi. P. 9-25-WPMH 320 H, Part 1, $27 5.505 mi. P. 9-25-WPH 320 H, Part 2, $14,69 all foregoing in Nemaha Co.***to Scherrer Bennett, 645 Minn St., Kansas City, earthwor storm sewer, sidewalk and guttering 1.455 m P. 30-3-WPMS 476 B, Wyandotte Co., $50,50 ***to Chandler Landscape & Floral Co., 1 West 47th St., Kansas City, roadside improv ment 1.341 mi. P. 73-29-WPH 376 A, Leave worth Co., $2,102***to A. L. Cook, Ottaw earthwork, culverts, 8.774 mi. P. WPSO 540 A Jackson Co., $21,706; 12.109 mi. P. WPSO 540-B, Atchison Co., $21,560***to B. Metzge Ozawkie, light type surfacing 8.774 mi. P WPSO 540A, Jackson Co., $12,972; 12.109 mi P. WPSO 54-B, Atchison Co., $18,543***t R. G. Aldridge, 1609 Nebraska St., Kansas City Mo., earthwork, culverts, concrete paving 0.35 mi. P. 60-20, WPGH 246 F, Johnson Co., $57 895. Grand total $400,358. Bids Mar. 24. Noted Mar. 10, C. D.—Mar. 12, E.N.-R.

Kansas—State Hy. Comn. at office of County Clerk, Wichita, **(P. Means Project)**, to Cook Gardens, Ottawa, roadside improvement 0.55 mi. P. 81-3A-WPMH 368 E2, $563; 0.097 mi. P. 160-27 WPMH 368 E1, Part 4, $1,148, 0.054 mi. P. 160-27-WPMH 368 E1, Part 5, $725, all foregoing in Summer Co.***to De Soto Kaw River Sand Co., De Soto, light type surfacing 3.851 mi. P. 45-12 FA 123, Part 1, $1,779; 4.564 mi. P. 45-12-FA 139, $2,109 both Pawnee Co.***to J. H. Shears Sons, Hutchinson, 8.921 mi. P. WPSO 536 A, $8,950 0.523 mi. P. WPMS 536 A, $525, both in Reno Co.; bituminous material surfacing 3.024 mi. P. 54-29-WPH 239 G, Butler Co., $8,341***to D. G. Hansen, Logan, 13.267 mi. P. 4-1G-WPSS 505-A, Rush Co., $12,679***to J. Coffey, Junction City, earthwork and culverts 2.08 mi. P. 4-1G-WPSS 505-B, $16,558***to M. W. Watson, National Bank of Topeka Bldg., Topeka, light type surfacing 2.08 mi. P. 4-1G-WPSS 503 B, $2,182, all foregoing in Rush Co.; 6.555 mi. P. 45-11-FA 115 A, Edwards Co., $3,285 ***to N. Ralph Sanford, Hoisington, earthwork and culverts 6.386 mi. P. 50N-11-FA 134 A, Pawnee Co., $42,247***to Rhoades Constr. Co., Newton, concrete and brick paving 0.011 mi. P. 81-7-WPMH 130 DV, Sedgwick Co., $2,860 ***to Stewart & Ritchie, Wichita, asphalt, paving, curbing, guttering 1.006 mi. P. 81-6 WPMH 130 D, Sedgwick Co., $97,116. Grand total $200,967. Noted Mar. 17, C.D.—Mar. 19, E.N.-R.

Louisiana—State Hy. Comn., Baton Rouge, H. B. Henderlite, state hy. engr., grading, gravel surfacing 8 mi. Meredith-Shady Grove Hy., Route 413, Project 1144, Winn Parish, to Delony & Tatum, Dubach, $39,586. Bids Feb. 12. Noted Feb. 21, C. D.—Jan. 23, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, grading, gravel surfacing 7.5 mi. Darnell-Richland Hy., Route 592 and 20, Project 1160, West Carroll Parish, to Barber Bros., Baton Rouge, $69,407. Bids Feb. 26. Noted Mar. 5, C. D.—Jan. 23, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, grading, reef shell surfacing 8.23 mi. Hurricane-Intersection Route 115, Route 565, Project 1122, Claiborne Parish, to T. L. James & Co., Ruston, $44,502. Bids Jan. 29. Noted Feb. 10, C. D.—Jan. 16, E. N.-R.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, bituminous macadam paving 23,100 sq.yd. and bitulithic concrete sidewalks 4,360 sq.yd. streets, Project WPMS 267, Lynn, to G. Rotondi & Sons, 199 Laurell St., Melrose, $44,281. Bids Mar. 24, awarded Apr. 3. Noted Apr. 3, C. D.

Mass., Arlington—Town, R. Adams, chn. Bd. P. Wks., Town Hall, highway and bridge construction and maintenance during 1936, day labor. $90,300.

Mass., Framingham—Town, B. F. Merriam, chn. Bd. P. Wks., Thos. A. Coyne, supt. Streets, Town Hall, bituminous macadam paving state aid project, under supervision of Commonwealth of Massachusetts, Dpt. P. Wks., $26,000*** hy. and bridge repairs, appropriation granted at Town meeting, $50,000***hy. reconstruction under W.P.A., bituminous macadam and gravel surfacing, $80,000, day labor. $156,000.

Mass., Springfield — Comrs. Hampden Co. plans rebuilding roads, Palmer, $14,000; Wilbraham, $6,300; West Springfield, $42,000;

†Federal Government

Streets and Roads (Continued)

Westfield, $21,000; Ludlow, $7,000; Agawam, $[illegible].000; Chicopee, $70,000; East Longmeadow, $3,500; Granville, $5,600; Hampden, $3,500; Holyoke, $20,000; Longmeadow, $14,000; Springfield, $280,000, destroyed by flood, day labor, by Towns and Cities with State and County Aid. Grand total $492,000.

Mass., Sterling—Town, C. W. Patten, supt. Streets, Town Hall, rebuilding gravel roads, day labor. $25,000.

Mass., Webster—Town, State, Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, and Worcester Co., bituminous macadam and gravel surfacing Bigelow Rd. and Tanner Rd., $13,500 each. State, County and Town, supply one third each of funds. Town builds by day labor under supervision of T. Toomey, supt. Streets. State Aid Projects.

Mass., West Brookfield — See "Bridges and Grade Crossings."

Mass., Worcester—City, E. Jenkins, supt. Streets, R. G. Lingley, city engr., City Hall, rebuilding bituminous macadam, oil and gravel and granite paved streets, damaged by flood, day labor. $225,000.

★ **Minnesota**—State Hy. Dpt., St. Paul, concrete paving 0.5 mi. State Project 53-11-48 F.A.P. 524-A, to E. W. Coons Co., Hibbing, $13,525***5,000 cu.yd. same project for city of Virginia, to Thornton Bros. Co., 1343 Dayton Ave., St. Paul, $10,000***0.6 mi. S.P. 61-3-31D, FAP 283, between 0.5 mi. and 1.5 mi. east of Frontenac, incl. 133,944 cu.yd. excav., to Fielding & Shepley, 814 Guardian Bldg., St. Paul, $81,164***grading, graveling 12.6 mi. S.P. 72-72-23-FAP 521-A, between Spooner and point 12 mi. south, 248,328 cu.yd. excav., to H. P. Lund & Son, Thief River Falls, $172,572***5.6 mi. State Project 40-4-55-1A, B and C, WPSS 544C, WPMS 546B, between Meire Grove and point 3 mi. south of Greenwold, 166,182 cu.yd. excav., to Volden Bros., Milan, $26,287***6.9 mi. S.P. 6-137-22-A1 and B, WPSS 537A and WPMS 537B, between Crosby and point 6 mi. north, 339,579 cu.yd. excav. and 8.1 mi. S.P. 34-162-21-2, WPSS 534B, between point west of Aitkin Co. line and Hill City, 201,274 cu.yd. excav., to Zontelli Bros., Crosby, $35,870 and $59,840 respectively***4.2 mi. S.P. 60-85-22-2B, WPGH 523A, between Worthing and point 2 mi. southwest of Brewster, 129,271 cu.yd. excav., to Sorenson Bros., Albert Lea, $29,744***8.4 mi. S.P. 60-85-23-1B, WPGH 523A and between Worthington and point 2 mi. southwest of Brewster, 129,271 cu.yd. excav., to E. A. Studer & Son, Excelsior, $45,672***14 mi. S.P. 6-34-26-1A and B, 3 and 2A, WPMH 368E and WPH 368D, F and G, between Renner and point 2.5 mi. northeast of West, Itaska Co., 1,651 cu.yd. excav., to R. C. Roth, Brainard, $69,674. Grand total $641,613. Bids Mar. 27. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Missouri—State Hy. Comm., Jefferson City, to Carte Harlin Constr. Co., West Plains, grading 3.444 mi. West Plains Rd., Mount View Rd., WPSO 743B, $14,404; 3.712 mi. WPSO 743C, same road, $18,973; 3.394 mi. WPSO 743A, same road, $10,272, all foregoing Howell Co.; 4.185 mi. Laclede Co., $27,805***to Davis Constr. Co., Booneville, 0.303 mi. Calhoun-Windsor Rd., WPGH 133B1, $45,300; 0.208 mi. WPGH 133A1, same road, $8,286, both Henry Co.; 0.198 mi. Sedalia, WPGM 350E, $151,207; 0.053 mi. WPGM 350C, $12,675, both Pettis Co.***to DeWitt Constr. Co., Kirkwood, 1.143 mi. Valles Mines to Route 61, WPSO 767A, Jefferson Co., $12,897; 4.189 mi. St. Francois Co., $28,353***to W. J. Menefee Constr. Co., Sedalia, graveling 4.488 mi. Route 66-Route E, WPSS 701A, $2,354; 1.308 mi. WPSS 701B, same road, $691, both Pulaski Co.***to A. W. Mosley, Platte City, 0.051 mi. Johnson Co., $11,834. Grand total $345,051. Bids Jan. 1 and Mar. 13. Noted Jan. 22, C. D. and Mar. 3, C. D.—Mar. 5, E. N.-R.

★ **Montana**—State Hy. Comn., Helena, to Tomlinson-Arkwright Constr. Co., Great Falls, constructing FAP-8-F, Units 1 and 2, $114,777 est. $130,653; FAP 10, Unit 6, $86,164 est. $96,346; FAP 229-B, E-4 and 5, 235-B5, $168,135 est. $195,787***to Nolan Bros., Inc., 18 North 2nd St., Minneapolis, Minn., FAP 35-A, 61-A, Unit 4, $34,543 est. $32,199***to Lawler Corp., Butte, WPGH 70-A, Unit 4, $92,211 est. $84,221***to Warren Northwest, Inc., Portland, Ore., FAP 77-G, Unit 2, $92,599 est. $91,095***to J. L. McLaughlin, Great Falls, FAP 98-A; Unit 2, $55,920 est. $60,625***to T. Staunton, Great Falls, Project WPSO 342, $34,270 est. $36,604***to J. C. O'Connor, Butte, WPSO 344, $41,664 est. $39,017***to Massman Constr. Co., New York Life Bldg., Kansas City, Mo., Project WPGS 377, $118,137 est. $132,334. Grand total $838,420. Bids Apr. 3. Noted Mar. 27, C. D.

New Mexico—State Hy. Dpt., Santa Fe, constructing State Highway Projects 53 and 93, to H. Thygesen, Albuquerque, $56,665 and $137,618 respectively***Project 107C, to P. Peabody, Las Cruces, $192,297***Project 242A, to W. E. Bondurant, Roswell, $304,045. Grand total $690,625. Bids Apr. 9. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

New York—See "Bridges and Grade Crossings."

N. Y., Albion—Orleans Co., constructing and reconstructing 22 mi. highways, relief labor. $150,000. **W.P.A.** H. D. Waldo, co. supt. Hys., in charge of work.

N. Y., Albion—Orleans Co., H. D. Waldo, supt. co. hys., constructing 22 mi. bituminous highways, by relief labor. $75,000 voted for materials and equipment. Total $150,000. **W.P.A.**

N. Y., Binghamton—City, repairing and repaving with concrete and macadam city streets, damaged by floods, own forces. $20,000-$25,000. Owners will purchase material. J. P. Wynne, supt. Maintenance & Operation, City Hall.

N. Y., Black Brook—Town, reconstructing 4 mi. South Schoolhouse Rd. from State Hy. 3 southerly, relief labor. $25,000. **W.P.A.** J. F. Leeds, South Street School, Glens Falls, procurement officer W.P.A., will purchase materials.

N. Y., Brushton—Village, repairing, guttering, shouldering, gravel and oil surfacing 0.75 mi. Wood Rd. and 0.75 mi. McCarthy Rd., relief labor. $25,000. **W.P.A.** J. F. Leeds, South Street School, Glens Falls, procurement officer W.P.A., will purchase materials.

N. Y., Cheektowaga—Village, widening to 18 ft. and constructing new road where necessary, Ludwig and Zurbrick Rds., relief labor. $32,000. **W.P.A.** H. F. Burd, 1014 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Chili and Wheatland—Villages, macadam paving 1.35 mi. Chili-Wheatland Rd., relief labor. $45,095. **W.P.A.** A. Hackett, 1460 South Ave., Rochester, procurement officer W.P.A., will purchase materials.

N. Y., Eastchester—Town Bd., widening, asphalt paving highway from Bronxville-Eastchester line to Eastchester-New Rochelle line, relief labor. $38,000. **W.P.A.** D. Jordan, High School, Main St., White Plains, procurement officer W.P.A., will purchase materials.

N. Y., Herkimer—Village, widening, guttering, constructing shoulders and graveling 1.5 mi. Myers Rd., $27,000; 1 mi. Thomas Rd., $12,000, relief labor. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

N. Y., Kingston—City, eliminating rock knolls, grading and filling low areas in 4th and 2nd Aves., Kingston, Rondout, Hooker and Moore Sts., relief labor. $36,000. **W.P.A.**

N. Y., Kingston—Village, grading, resetting, curbing, surfacing Hemlock St., $8,093; excavating, laying bottom and top courses and resetting curbs in concrete on West Reilly St., relief labor. $29,000. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, procurement officer W.P.A., will purchase materials.

N. Y., Lancaster—Village, improving drainage structures, road shoulders on Lake Ave., Hall, Brunck, Aurora, Ransom, Erie, Cemetary and Stienfelt Rds., relief labor. Est. about $23,000. **W.P.A.** H. F. Burd, 1014 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Orchard Park—Village, macadam paving, guttering, Benning, Burton and Drandt Rds., relief labor. $32,000. **W.P.A.** H. F. Burd, City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Rochester—Village, repairing, guttering, paving 7.5 mi. Cherry Town Rd. from County Highway at Palentown to county highway at Pautaukunk, relief labor. $35,000. **W.P.A.** D. Jordon, High School, Main St., White Plains, procurement officer W.P.A., will purchase materials.

N. Y., Rome—City, City Hall, graveling various streets, relief labor. $35,000. **W.P.A.** D. Mahoney, procurement officer W.P.A., will purchase materials.

N. Y., White Plains—Westchester Co. Hy. Dpt., Court House, repairing and reconstructing highways, incl. macadam and concrete paving, guttering, etc., own forces. Received $418,976 from state as gasoline tax refund to finance same. Owner purchases materials.

North Carolina—State Hy. Comn., Raleigh, gravel surfacing, grading, 2.75 mi. Project 9405, Haywood Co., to E. W. Grannis, Fayetteville, $39,526; structures between Bethel and Springdale, Project 9405, Haywood Co., to Hobbs-Peabody Constr. Co., 317 West Worthington Ave., Charlotte, $29,870. Bids Mar. 17. Noted Mar. 23, C. D.

★ **Ohio** — **J. J. Jaster, Jr.**, State Hy. Dir., Columbus, grading, drainage structures, concrete paving 1.962 mi. Meigs Co., to Bellefontaine Development Co., Bellefontaine, $121,937***cold mixed resurfacing, cold laid asphaltic concrete paving 0.313 mi. Wyandot Co., to Batdorf & Martin, Upper Sandusky, $9,942***grading, drainage structures, concrete widening 0.929 mi. Montgomery Co., to Republic Asphalt Paving Co., Summit St. and Pennsylvania R.R., Dayton, $79,464***drainage structures, concrete widening, hot mixed and hot laid asphaltic concrete resurfacing 0.341 mi. Muskingum Co., to Dunzweiler Constr. Co., Richards Bldg., Zanesville, $29,650***grading, brick on rein.-con. paving 1.362 mi. Ross Co., to W. H. Ringwald & Son, 42 East 2nd St., Chillicothe, $71,463***grading, drainage structures, hot mixed, hot laid asphaltic concrete paving, roadside improvements, 0.772 mi. Belmont Co., to Tristate Asphalt Corp., South Broadway, Martins Ferry, $46,559***grading, drainage structures, concrete widening, roadside improvement, 0.309 mi. Fayette Co., to

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†*Federal Government*

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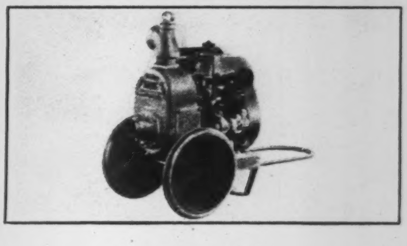

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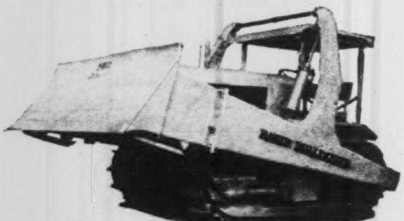

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Streets and Roads (Continued)

Andrews Asphalt Paving Co., 1st National Bank Bldg., Hamilton, $42,683***grading, drainage structures, brick paving, roadside improvement 0.373 mi. Montgomery Co., and constructing grade crossing elimination, 0.309 mi. Clark Co., to Churchill Inc., 835 East North St., Lima, $49,991 and $44,194 respectively***constructing rein.-con. bridge, brick faced concrete superstructure, 3.608 mi. Stark Co., to E. O. Vogt Paving Co., 846 Wellman Ave., Massillon, $259,681. Grand total, $755,564. Bids Mar. 31. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Oregon—State Hy. Dpt., Salem, grading, oil mat surfacing 0.765 mi. Doty Ranch Danebo Rd. Sect. and 1.41 mi. Oak Hill Doty Ranch Sect., Eugene Veneta Hy., to Consolidated Hy. Co., Inc., Portland, $16,141 and $30,443 respectively. R. H. Baldock, hy. engr.

Pa., Tyrone—Boro, filling in and resurfacing various streets throughout borough, damaged by flood, day labor under supervision Boro Hy. Dpt., D. G. Puderbaugh, Blair Co. W.P.A. dir. $125,000. **Maturity at once.** Boro will purchase materials.

★ **South Dakota**—State Hy. Comn., Pierre, oil surfacing 8.582 mi. FAP 30, reopened, Brule Co., to C. L. Yost, Bristow, Ia., $47,324 ***18.008 mi. FAP 58, reopened, Codington Co., to Megarry Bros., Bismarck, N. D., $99,005 ***12.123 mi. FAP 87 and 137, reopened, Lake Co., and 20.331 mi. FAP 177A, reopened, Pennington Co., to Summit Constr. Co., Summit, $68,359 and $110,679 respectively***grading 13.41 mi. WPH and WPMH 61A, Brule Co., to W. P. Tieszen, Marion, $61,042***5.538 mi. WPH and WPMH 93, Miner Co., to J. C. Sorenson, Trent, $25,971***0.456 mi. WPGH 138A, Lawrence Co., to Inland Constr. Co., 3867 Leavenworth Ave., Omaha, Neb., $25,007*** 0.486 mi. WPGH 172A, Edmunds Co., to H. J. Hawley, Aberdeen, $23,502***8.015 mi. WPH 195A, 249A and 252, Hamlin Co., to Watertown Cement Products Co., Watertown, $35,088 ***7.991 mi. WPSO 395, Spink Co., to Williamson & Creager, Ft. Pierre, $31,771***resurfacing 13.113 mi. FAP 56, Sully Co., and 19.656 mi. FAP 164, Brookings and Moody Counties, to M. Joyce, Brandon, $7,463 and $15,502 respectively***17.704 mi. FAP 117 and part 162A and B, Haakon Co., to S. S. Roberts, Rapid City, $8,156. Grand total $558,869. Bids Mar. 31. Noted Mar. 25, C. D.

Tennessee—State Hy. Dpt., Nashville, paving 0.6 mi. and 1 mi. Hy. 3, Lauderdale Co., to Walker & Michael, 1021 Haywood St., Memphis, $18,793 and $80,193 respectively***5 mi. Hy. 112, Davidson Co., to Municipal Paving & Constr. Co., American Natl. Bank Bldg., Nashville, $129,931***grading, drainage 2 mi. Hy. 53, Jackson Co., to B. G. Young, Ashland City, $34,442***2 mi. Hy. 52, Fentress Co., to Walters & Prater, Morristown, $41,649. Grand total $305,008. Bids Apr. 3, awarded Apr. 6. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, grading, small drainage structures 18.228 mi. State Hy. 35, Brazoria Co., and double asphalt on gravel surface treating 0.678 mi. State Hy. 67, Bosque Co., to Cage Bros., Bishop, $96,648 and $10,273 respectively, est. $100,000 and $10,000 respectively***grading, select material surface course 8.352 mi. State Hy. "F," Collin Co., to Central Bitulithic Co., P. O. Box 5343, Dallas, $35,119 est. $40,000***grading, drainage structures, select material surface course paving 5.61 mi. State Hy. "F," Grayson Co., to McCall Eng. Co., P. O. Box 331, Waco, $63,938 est. $70,000***4.673 mi. State Hy. "F," Jones Co., to J. E. Barnhill, Plainview, $17,610 est. $20,000***grading, drainage structures, road oil and asphalt on iron ore top soil base course paving 5.813 mi. State Hy. "F," Rusk Co., to Gifford Hill & Co., 412 Mercantile Bldg., Dallas, $48,015 est. $50,000. Grand total $271,603. New **P.W.A.** Noted Mar. 25, C. D.

★ **Texas**—G. Gilchrist, state hy. engr., Austin, concrete paving 12.095 mi. State Hy. 15, Harrison Co., to Harrison Eng. & Constr. Co., Fairfax Bldg., Kansas City, Mo., $300,913 est. $300,000***grading, drainage improvement, doube asphalt on caliche surface treating 10.87 mi. State Hy. 27, Pecos Co., to R. W. McKinney, Nacogdoches, $91,926 est. $100,000***grading, drainage structures, double asphalt on caliche and limestone surface treating 13.554 mi. State Hy. 1, Ward Co., to Cocke & Braden, Marshall, $174,099 est. $170,000. Grand total $566,938. Bids Mar. 17. Noted Mar. 25, C. D.

★ **Virginia**—Dpt. Hys., Richmond, improving 2.1 mi. Westmoreland Co., and 14th St., 6th St. on East St., West Point Co., to Luck Constr. Co., 1617 Brook Rd., Richmond, $41,919 and $13,102 respectively***0.22 mi. Smyth Co., to W. N. Jackson, Meadowview, $7,442***0.3 mi. and 0.49 mi. Harrisonburg Co., to Echols Bros., Inc., Staunton $9,888***0.73 mi. and 0.62 mi. Amherst Co., and Richmond intersecting Three Chopt Rd., Henrica Co., to S. E. Finley, Roanoke, $20,486 and $53,581 respectively***0.063 mi. an 0.32 mi. Grayson Co., to M. A. Goode, Virgilina $4,988***4.9 mi. and 5.4 mi. Albemarle Co., to G. G. Waugh & Co., Culpeper, $76,243***4.7 mi. Bedford Co., to Perkins Barnes Constr. Co., Blackstone, $67,706***0.18 mi. and 0.75 mi. Tazewell Co., to C. D. and C. P. Fugate, Wise, $59,783***Main St, Chatham Co., to P. L. Baird, Roanoke $1,310 ***0.88 mi. Pulaski Co., to Alley Constr. Co., Bristol, $9,309***Fig. St., Manson Ave., Bay Ave., and Washington Ave., Cape Charles Co., to Tunstall Johnson Co., Norfolk, $42,488.

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Grand total $408,205. Bids Mar. 31. Rejec bids Mar. 31, improving 0.56 mi. Route 5 Project 160-G1-3, Isle of Wight Co., 0.004 Route 234, WPSS 1111 A. Prince William Co

Wash., Asotin—City, surfacing, improvem 7 mi. Peola Rd., incl. 24,890 cu.yd. Class earth and 440 cu.yd. structural excav., to T angle Constr. Co., 1220 Ide St., Spokane, $ 839. J. W. Swain, Court House, engr.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

★ **†Conn., Hartford**—U. S. Eng., Federal Bl Providence, R. I., plans nearing complet dredging 60,000 cu.yd. in Connecticut Ri Total est. about $530,000.

La., New Orleans—Orleans Levee Bd. pl constructing flood gates on London Ave. a Bayou St. John Canals, near Lake Pontch train, Orleans Parish.

Mass., North Truro — Town and Commo wealth of Massachusetts, Dpt. P. Wks., W. Callahan, comr., 100 Nashua St., Boston, pl stone rip rap breakwater. $14,000 or mo G. H. Delano, 100 Nashua St., Boston, engr.

Mass., Winthrop—Commonwealth of Massa chusetts, Dpt. P. Wks., W. F. Callahan, com G. H. Delano, ch. engr., 100 Nashua St., Bo ton, making plans dredging Shirley Gut betwe Winthrop and Deer Island, and constructi stone jetties. Est. about $80,000.

N. Y., Rockaway Beach—G. U. Harvey, pr Queens Boro, Subway Bldg., Long Island Cit asked Bd. Estimate to appropriate $150,0 for jetties and sand with which to build beac incl. dredging 400,000 cu.yd. sand from Jamai Bay. A. K. Johnson, engr. in charge.

★ **†Tex., Denison**—U. S. Eng., Wash., D. C surveying for establishment of floo control in Red River Valley, incl. dredgi widening, straightening channel, embankment etc. $500,000.

Tex., Port Lavaca — City soon takes bid harbor improvements, involving dredging to depth of 7 ft., removing 50,000 to 60,000 cu.yd material, building two 160 ft. wooden dock each 160 ft. long, 600 to 700 ft. protectiv pilings. $23,000. P.W.A. project. Garrett En Corp., 300 Hughes St., engrs.

BIDS ASKED

Kansas—See "Streets and Roads."

†Maryland—Apr. 23, by U. S. Eng., 332 Pos Office Bldg., Baltimore, dredging 84,000 cu.yd. for channel in Parish Creek.

†New Jersey—Apr. 21, by U. S. Eng., Phila. Pa., dredging 19,000 cu.yd. from Cooper River.

N. Y., Binghamton—See "Contracts Awarded."

N. Y., Lindenhurst—See "Contracts Awarded."

N. Y., Mamaroneck — See "Contracts Awarded."

†Va., Norfolk—Apr. 28, by U. S. Eng., Norfolk, dredging 242,000 cu.yd. in southern branch Elizabeth River, Norfolk Harbor.

CONTRACTS AWARDED

†California—U. S. Eng., Sacramento, repairing and constructing old and new levees on Feather River, in Reclamation Dist. 784, from point 1.7 mi. below Eliza Bend Pump to upper end of Starr Bend, 4 mi., to Macco Constr. Co., 815 Paramount Bldg., Clearwater, $135,576. Bids Mar. 26, awarded Apr. 3. Noted Apr. 2, C. D.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, dredging 27,000 cu.yd. entrance channel and anchorage basin in Lake Anthony, Oak Bluffs, and 19,800 cu.yd. entrance channel and anchorage basin in Hither Creek, to H. T. Gerrish, 10 State St., Boston, $13,520 and $10,910 respectively. Bids Mar. 24, awarded Apr. 3. Noted Apr. 3, C. D.—Mar. 26, E. N.-R

Mass., Springfield—See "Sewerage & Waste Disposal."

N. Y., Amherst—Village, straightening Gott Creek, grub trees, widening and slope banks, installing Calco flap gates, to prevent floods, relief labor. $20,000. **W.P.A.** H. F. Burd, 1016 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

★ **N. Y., Binghamton**—City, constructing dike along Susquehanna River at McDonald Ave. to protect 1st Ward for flood prevention, relief labor. Total est. $2,000,000. **W.P.A.** A. Calabriso, Telephone Bldg., Binghamton, procurement officer W.P.A., will purchase materials. J. A. Giles, city engr. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

N. Y., Binghamton—Bd. Supervs. Broome Co., constructing logs and field stone check dams in creeks and gullies on farms in Broome County for flood control, relief labor, under supervision C. V. Canole, district W.P.A. director, Telephone Bldg., Binghamton. **W.P.A.**

N. Y., Lindenhurst — Village, constructing 2,084 ft. bulkhead pier along shore road, relief labor. $18,000. Treas. Dpt. Procurement Div., 76 9th Ave., New York, will purchase materials.

†*Federal Government*

Earthwork, etc. (Continued)

N. Y., Mamaroneck — Village, constructing masonry walls, abutments, along Hillside Ave., bank of Mamaroneck River and cleaning out river bed, relief labor. $29,253. **W.P.A. D.** Jordon, High School, Main St., White Plains, procurement officer W.P.A. will purchase materials.

N. Y., Owego — See "Bridges and Grade Crossings."

Sask., Regina—Provincial Govt., constructing Eastend irrigation scheme, dam, 1,700 ft. long, 22 ft. high, on Frenchman River to provide water for irrigating 2,200 acres, involving 70,000 cu.yd. earth excav., 2,000 bbl. cement, to Beattie Ramsay, Lumsden, $75,000; concrete and steel work, to Poole Constr. Co., Regina, $40,000.

UNCLASSIFIED

PROPOSED WORK

★ **Calif., San Francisco**—SUBWAY—City and San Francisco Co., plans Market St. subway system, between 1st and Church Sts., (recommended by Citizen's Rapid Transit Finance Advisory Committee, and Public Utilities Comn. of City and County), est. $18,000,000 to $20,000,000; also boulevard system, incl. tunnels. Total est. of traffic correction $52,700,000. J. J. Casey, city engr. Noted June 27, C. D.—July 4, E. N.-R.

★ **Colo., Denver** — RAILROAD IMPROVEMENTS—Denver and Rio Grande Western R.R., W. McCarthy and H. Swann, trustees, authorized to expend $1,500,000 for modernization of mechanical equipment and road bed. Contract for 10,000 tons heavy rails and creosote for treatment of ties, awarded to Colorado Fuel & Iron Co., Continental Oil Bldg., Denver, $600,000 and $78,000 respectively.

Colo., Pueblo — SWIMMING BEACH — City Council, G. W. Clark, city clk., preparing plans for water system, bath house, outdoor beach, City Park. $25,000. W.P.A. project.

†D. C., Wash.—TRANSMISSION LINES—Rural Electrification Administration, M. L. Coole, administrator, reports bids will be received by co-operatives in Ohio, Illinois, Kentucky, Nebraska, South Carolina, Tennessee and Virginia for rural distribution lines, mostly 2,300 and 6,700 volts. Estimated at several million dollars. R.E.A. has loaned money. Specifications upon request, address M. L. Cooke, administrator, Wash., D. C.

Ill., Springfield — COAL HANDLING PLANT, etc.—Old West Mine, Springfield, plans repairing and altering coal handling plant and tipple. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Kan., Junction City—SWIMMING POOL, etc. —City plans by C. W. Shaver, 828 United Life Bldg., Salina, swimming pool and bathhouse. $30,000. Election Apr. 7, to vote bonds for same.

†Louisiana—TELEPHONE LINE—U. S. Coast Guard Station, Mobile, Ala., applied for permit to install and maintain submarine cable for telephone line across, under and on bottom of Bayou LaFourche, 10 ft. downstream from bridge at Leesville and 13 mi. above its mouth.

★ **Mass., Fall River**—STATE PIER—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., G. H. Delano, ch. engr., 100 Nashua St., Boston, plans State Pier, timber, concrete, steel, wood pile found. $500,000.

Mass., Nantucket—WHARF—Pacific Oil Co., W. Durfee, in charge, Central St., Fall River, plans rebuilding creosoted pile, timber wharf. Est. about $25,000. S. T. Dubitzky, 38 Third St., Fall River, engr.

N. J., Sussex — SPORTS DEVELOPMENT — Seckler & Sheperd, Lake Wallkill, Sussex, plans cabins and sports development, Lake Wallkill, $140,000. Private plans.

N. Y., Long Beach—BOARDWALK—City will readvertise for bids for constructing boardwalk. Former contract not approved by P.W.A. because of irregularity in specifications. Noted Mar. 27, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., New York—TRUCKING AREA, etc.—Rockefeller Center, Inc., 30 Rockefeller Plaza, plans by Reinhard & Hofmeister, 30 Rockefeller Plaza, trucking and circulating area below stores and office building, 13 West 49th St. $60,000.

N. Y., Woodridge—SWIMMING POOL—N. Shein, c/o A. H. Okun, archt., 16 Starr Ave., Monticello, soon takes bids constructing 50x85 ft., concrete swimming pool. To exceed $23,000.

N. Y., Yonkers — STADIUM — Bd. Supervs. Westchester Co., Court House, White Plains, making plans constructing steel, concrete baseball stadium at Tibbetts Brook Park, or at Cross County Parkway and Central Park Ave., $70,000.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, made preliminary plans constructing 7,500 lin.ft. 24 in. gas line on Everest Ave. $45,000. A. H. Riney, Bartlesville, engr.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, made preliminary plans constructing 8,000 lin.ft. 20 in. wet gas line on Everest St. $32,000. A. H. Riney, Bartlesville, engr.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, surveys completed 8,000 lin.ft. 20 in. wet gas line on Lindsey and 25th Sts. $60,000. A. H. Riney, Bartlesville, engr.

★ **Okla., Oklahoma City**—PIPE LINE—Continental Oil Co., Ponca City, preliminary plans made constructing 110 mi. 8 in. oil line from Ada to Oklahoma City, with pump stations. $1,000,000. R. T. Looney, Ponca City, engr.

Tex., Longview—AIRPORT—Gregg Co., c/o J. Humphries, judge, defeated $100,000 bonds for municipal airport. Engineer, c/o City, engr.

BIDS ASKED

Calif., Los Angeles—OIL and GAS DEVELOPMENT—See "Contracts Awarded."

Conn., Hartford — FIRE ALARM BOX REPAIRS—See "Contracts Awarded."

†Me., Bangor — AIRPORT — See "Contracts Awarded."

Mass., Boston—WADING POOL, etc.—Apr. 24, by City of Boston, Trustees of George Robert White Fund, City Hall Annex, constructing concrete wading pool, locker buildings, walks, grading, etc., at Health Unit 7, Whittier, Downing, Vernon and Hampshire Sts., Roxbury. To exceed $40,000. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

Mass., Norwood—FIRE STATION, etc.—May 2, by Town, W. C. Kendrick, mgr., Town Hall, addition to fire station, and furnishing, installing fire alarm central station equipment; revisions to existing fire alarm signal system. W. G. Upham, 700 Washington St., Norwood, engr.

N. H., Laconia—BARN, etc.—See "Contracts Awarded."

New York—BLOCK SIGNALLING SYSTEM, etc.—Apr. 28, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing block signalling and interlocking equipment and installing portions of such equipment for portion of Independent City-owned Rapid Transit R.R. from Fulton St. to Nassau Ave., Brooklyn Boro; constructing station finish work for part of Rapid Transit Railroad Route 108, Sects. 10 and 11, on Sutphin and Parsons Blvd., and 169th St. Stations, Queens Boro.

N. Y., Canton — ATHLETIC FIELD — See "Contracts Awarded."

†N. Y., Mineola—AIRPORT—See "Contracts Awarded."

N. Y., Woodbridge — SWIMMING POOL — Michael Deutch, c/o A. H. Okun, engr., 16 Star Ave., Monticello, taking bids 40x100 ft., rein.-con. swimming pool, complete with filtering and chlorinating system, etc. Est. about $23,000.

Oklahoma—OIL DEVELOPMENT—See "Contracts Awarded."

Utah, Salt Lake City—AIRPORT—See "Contracts Awarded."

Utah, Salt Lake City—BOATING RESORT—See "Contracts Awarded."

Wis., Lily—DAM—See "Contracts Awarded."

Wyo., Glenrock—OIL PIPE LINE—See "Contracts Awarded."

†C. Z., Balboa—WHARF—May 27, by Yards & Docks, Navy Dpt., Wash., D. C., rein.-con. wharf, bituminous macadam road, water and electrical services, at Naval Ammunition Depot, Spec. 7820.

CONTRACTS AWARDED

Calif., Los Angeles—OIL and GAS DEVELOPMENT—Supreme Oil, Inc., 70 Pine St., New York, oil and gas development, Signal Hill oil fields, day labor. $50,000 or more. Owner will purchase materials.

Calif., Los Angeles—RAILWAY EXTENSION —A. Eldridge, genl. mgr. City Harbor Dpt., City Hall, constructing standard gage railroad track, incl. grading, track laying trestle construction, paving, automatic grade crossing protection, etc., Harbor Spec. 946, P.W.A. Docket 1208, Unit 1, to Shannahan Bros., 6181 Eastern Ave., $71,870. Est. $119,247. **P.W.A.** Bids Feb. 19, awarded Apr. 1. Noted Feb. 26, C. D.—Feb. 6, E. N.-R.

Calif., Los Angeles—OIL and GAS DEVELOPMENT—L. D. Greenfield Co., 521 5th Ave., New York, oil and gas development, Playa Del Rey Oil Fields, Los Angeles Co., day labor and separate contracts. To exceed $50,000.

†Calif., Point Beyer—NAVAL DIRECTION FINDER STATION—Yards & Docks, Navy Dpt., Wash., D. C., repairing naval direction finder station, Spec. 8150, to F. J. Early, Jr., 369 Pine St., San Francisco, $2,000.

Colo., Pueblo—HORSE BARNS—State Fair Comn., E. Clark, 1st Natl. Bank Bldg., start work immediately first units ten 35x300 ft., stone, concrete horse barns, day labor. $25,000. Total est. $250,000. Only half of units started now. W.P.A. and state funds.

Conn., Hartford — FIRE ALARM BOX REPAIRS—City, Bd. Fire Comrs., repairing fire alarm boxes and wiring in flood areas, W.P.A. labor. $49,908.

†Me., Bangor—AIRPORT—Dpt. Commerce, Airway Div., H. F. Law, div. ch., 424 Park

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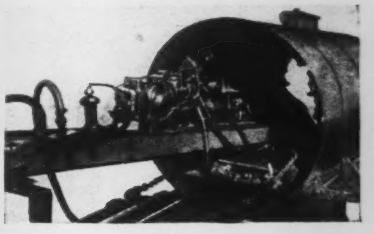
†*Federal Government*

BUILD SEWERS IN TUNNEL



● Save paving replacement.
● Save traffic inconvenience.
● Save underground structure replacement.
● Build concrete lining blocks at home with local labor and local materials.
● Construct sewer in tunnel with local labor.

Skilled shield operator furnished by Link-Belt Company. As economical as open cut construction at depth of 12 ft. Complete tunnel shield and block making equipment rented by Link-Belt Company at fixed price per foot of tunnel constructed. See descriptive article in Engineering News-Record, December 12, 1935, or write for reprint.

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TUNNEL SHIELD

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POWER-WHEEL
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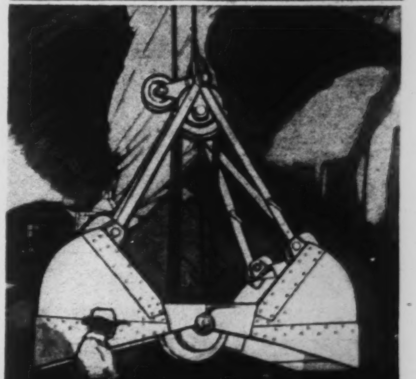
BUCKETS



Capacities: ½ to 15 Yards for All Kinds of Light or Heavy-duty Service.

INDUSTRIAL BROWNHOIST
BAY CITY, MICHIGAN
New York, Philadelphia, Cleveland, Chicago
Agents in principal cities

Unclassified (Continued)

Sq., Boston, Mass., and City of Bangor, airport improvements, incl. grading, runways, hangars, etc., day labor by city. Est. $30,000. Owners, Boston office as above, will purchase materials.

Me., Fryeburg—DAM—Central Maine Power Co., Green St., Augusta, 100 ft. rein.-con. dam to replace dam recently destroyed by flood in Saco River, to J. A. Greenleaf & Sons, 20 Washington St., Auburn. Est. $25,000. Private plans by Chief Engineer. Awarded about Apr. 3.

Me., Livermore Falls—DAM—International Paper Co., Livermore Falls, reconstructing 200 ft. upper dam and 100 ft. lower dam on Androscoggin River, destroyed by flood, hollow crib construction, to J. A. Greenleaf & Sons, 20 Washington St., Auburn, to exceed $75,000.

†Mass., Gloucester—CAISSON FOUNDATIONS—Dpt. Commerce, E. Easton, supt. Lighthouses, 37 Marginal St., Chelsea, constructing 7 steel sheet piling caisson foundations, interlocking type, for beacon in Annisquam River, to Rendle Contg. & Dock Building Co., 230 Meridian St., East Boston, $7,975. Bids Mar. 25, awarded Apr. 9. Noted Mar. 31, C. D.—Mar. 19, E. N.-R.

N. H., Laconia—BARN, etc.—Belknap Co. Farm, W. J. Hartford, supt., one story, 30x36 ft., 30x75 ft., 35x100 ft., frame barn and silos, concrete found., at County Farm, day labor. $35,000-$40,000. N. Randlett, Main St., archt.

New York—MAIN CABLES, etc.—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, installing main cables and air lines, etc., for signal system, Queens Line, to Emerson Hines, Inc., 370 Lexington Ave., New York, $375,000. **P.W.A.** Bids Nov. 8. Noted Oct. 31, C. D.

N. Y., Brooklyn — COAL POCKETS — Burns Bros. Coal Co., 500 5th Ave., coal pockets, 60th St. near 2nd Ave., to Nicholson Co., 405 Lexington Ave., New York. Est. $40,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Buffalo — SWIMMING POOL — City. Div. Purchase, City Hall, 35 tons reinforcing steel for stadium and swimming pool at side of Old Best Reservoir at Best and Masters Sts., to Hawkins & Howlett, 243 Capen Blvd., to exceed $1,000; fabricating steel, to Concrete Steel Co., 207 James St., Syracuse, and 243 Capen Blvd., Buffalo. **W.P.A.** Noted Sept. 3, C. D.—Sept. 5, E. N.-R., under "Contracts Awarded."

N. Y., Canton — ATHLETIC FIELD — State School of Agriculture, Canton, constructing athletic field, incl. baseball diamond, quarter-mile cinder track, grandstand, relief labor. To exceed $23,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

†N. Y., Mineola—AIRPORT—Con. Q.M. repairing plumbing, heating, electrical work, woodwork, brick work, foundations, roofs, gutters, painting, etc., buildings at Mitchell Field, relief labor. $151,855 allotted by W.P.A. U. S. Treas. Dpt. Procurement Office, 76 9th St., New York City, will purchase materials.

Oklahoma—OIL DEVELOPMENT, etc.—F. G. Wylie & Co., 535 5th Ave., New York, N. Y., constructing oil and gas development, Oklahoma County, day labor and separate contracts. $50,000 or more.

Pa., Wilkes-Barre—AIRPORT—City, development of Wyoming Valley Airport, incl. hangars, runways, illumination, grading, day labor under supervision of W. P. Johns, city engr. $167,000. **W.P.A. Maturity at once.** City will purchase materials soon. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

Utah, Salt Lake City—AIRPORT—City, constructing improvements on municipal airport, day labor. $50,000 appropriated. W. D. Beers, city engr. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Utah, Salt Lake City—BOATING RESORT—Salt Lake Co. Comrs., breakwaters, landing pier and buildings on Great Salt Lake for boating resort, relief labor, under **W.P.A.** $50,000 allocated by W.P.A. H. J. Blake, Salt Lake City, engr.

Wis., Lily—DAM—Wolf River Hydro-Electric Co., Clintonville, constructing 207 ft. timber, concrete dam, on Wolf River, 4 mi. north of Lily, in Langlade Co., W.P.A. labor. Hy. Olk, Antigo, engr.

Wyo., Glenrock — OIL PIPE LINE — Continental Oil Co., constructing 19.8 mi. 2 ft. oil pipe line from Lance Creek to Manville, day labor. $36,000.

MATERIALS AND EQUIPMENT

PROPOSED WORK

ROAD DISC, etc.—**Coalinga, Calif.**—E. McCroskey, city clk., soon takes bids 1 road disc and planer.

†STONE SPALLS—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., rejected bids Mar. 25, furnishing 40,000 cu.yd. stone spalls, Spec. 530. To exceed $1,000. Noted Apr. 3, C. D.

WROUGHT STEEL PIPE—**Los Angeles, Calif.**—D. P. Nicklin, purch., agt., Dpt. Water & Power, 207 South Bway., rejected bids Mar. 30, 5,000 ft. ½ in. standard galvanized T and C, 5,000 ft. ¾ in. same, 10,000 ft. 1 in. same, 5,000 ft. 2 in., 500 ft. 3 in., standard galvanized T and C wrought steel pipe, 5,000 ft. 1 in. same, extra heavy, 500 ft. 4 in. and 250 ft. 6 in. standard black T and C, 1,000 ft. 6 in. and 500 ft. 8 in. standard black plain ends, 500 ft. 4 in. and 250 ft. 6 in. same extra heavy, Spec. 1919. To exceed $2,000.

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CONCRETE MIXERS, etc.—**Oakland, Calif.**—W. W. Chappell, city clk., soon takes bids 4 concrete mixers, three of 3½ cu.ft. and one 7 cu.ft. capacity, 2 air compressors, one of 105 cu.ft. capacity of free air per min. and one of 160 cu.ft. free air per min.

TRUCKS, etc.—**Framingham, Mass.**—Town, B. F. Merriam, chn. Bd. P. Wks., Town Hall, plans purchasing soon two 1½ ton trucks, $1,300 appropriated; and 2 snow plows, $3,400 appropriated.

PUMPER—**Lawrence, Mass.**—City, W. A. Griffin, City Hall, plans purchasing new pumper for Fire Dpt. $13,300 appropriated.

DUMP TRUCK, etc.—**Stoneham, Mass.**—Town, E. C. Hunt, chn. Bd. Selectmen, Town Hall, plans purchasing 1 dump truck for Street Dpt., $1,000; 1 truck for Park Dpt., $740; 1 truck for Town Infirmary, $660.

CONCRETE MIXER, etc.—**Webster, Mass.**—Town, J. A. Patenaude, chn. Bd. Selectmen, Town Hall, plans purchasing soon 1 concrete mixer, $900; motor and switchboard for water pumping station, $2,500.

FIRE TRUCK—**Odin, Minn.**—Village, M. E. Olson, clk., plans purchasing fire truck to serve both village and rural area adjoining.

PUMPER—**Proctor, Minn.**—City, J. B. Eales, ch. Fire Dpt., plans purchasing 750 g.p.m. pumper.

FIRE TRUCK—**Polson, Mont.**—City, R. B. Davidson, clk., plans purchasing fire truck. $2 500-$3,500.

PUMPS—**Binghamton, N. Y.**—City, City Hall, will purchase pumps and appurtenances for installation in 9 proposed pump houses, in connection with proposed $2,000,000 flood control program. To exceed $100,000. J. A. Giles, city engr.

FIRE EQUIPMENT—**Cold Spring Harbor, N. Y.**—Voters authorized $10,000 for purchase of fire equipment.

STORAGE TANK—**Cortland, N. Y.**—Sinclair Refining Co., lessee, 639 5th Ave., New York, will purchase 500 and 1,000 gal. storage tanks for gasoline service station at 16 Watson St., for C. H. Ames, South Main St. To exceed $1,000.

GASOLINE TANKS, etc.—**New York, N. Y.**—Socony Vacuum Oil Co., 26 Bway., plans purchasing several 1,000 gal. underground gasoline tanks, pumps, etc., for service station, at 569 1st Ave. To exceed $10,000.

STEEL TANK—**Schenectady, N. Y.**—American Oil Co., 122 West 42nd St., New York, soon purchases 1,000 gal. gasoline storage tank, for service station at 136 Erie Blvd., To exceed $1,000.

GRADER, etc.—**Naticoke, Pa.**—City, M. B. Znaniecki, clk., City Hall, plans purchasing motor grader, with tractor and scarifier, one 2 batch concrete mixer, one 5 ton roller with scarifier, one motor driven street sweeper. To exceed $1,000.

SAND — **Scranton, Pa.** — See "Contracts Awarded, under Asphalt, etc."

STEEL TANKS, etc.—**York, Pa.**—Spur Distributing Co., Franklin, Rd., Nashville Tenn., plans installing 500 gal. steel tanks, electric pumps, air compressor and other equipment at gasoline service station, North and George Sts. $1,000 or more.

PIPE—**Sioux Falls, S. D.**—R. E. Bragstad, city engr., authorized to get quotations for purchase of 1,100 lin.ft. 30 in. pipe for storm sewer in Minnesota Ave. between 14th and 18th Sts., for City.

TANKS, etc.—**Coaticook, Que.**—Shell Oil Co. of Canada Ltd., 660 Ste. Catherine St. W., Montreal, will require two 1,000 gal. gasoline tanks, and 2 twenty gal. visible pumps, for proposed gasoline service station, Childs St. $30,000.

BIDS ASKED

†STATIONARY HOIST—**Rio Vista, Calif.**—U. S. Eng., Post Office Bldg., Sacramento, taking bids furnishing gasoline engine driven 2 drum stationary hoist.

†WOODWORKING MACHINE, etc.—**Wash., D. C.**—Apr. 22, at office General Purchasing Officer Panama Canal, Wash., D. C., woodworking machine, metal roofing, fire hydrants, manholes, frames and covers, copper wire and cable, magnet wire, transformers, panel boards, motor starting switches, etc.

PAVING MATERIALS, etc.—**Newcastle, Ind.**—City taking bids materials for block top surfacing, repairing, curbs and crossings 5 mi. streets. $25,000 or more.

TRANSFORMERS—**Newcastle, Ind.**—Public Service Corp. of Indiana, in market for new transformers for Chrysler Motor Car Corp., to replace 10 destroyed by fire. $35,000.

BRIDGE LUMBER, etc.—**Algona, Ia.**—Apr. 23, by Kossuth Co., E. J. Butler, aud., 80,000 ft. BM bridge lumber; 2 carloads red cedar piling; and 8,000 lin.ft. culvert pipe. H. M. Smith, co. engr.

BRIDGE LUMBER, etc.—**Forest City, Ia.**—Apr. 22, by Winnebago Co., O. C. Narum, aud., 1 carload Class A untreated bridge lumber and 2,900 lin.ft. 15- to 24-in culvert pipe. G. S. Jones, co. engr.

DIESEL FUEL OIL, etc.—**Sac City, Ia.**—Apr. 22, by Sac Co., W. Gilbert, aud., Diesel fuel oil, oil and grease, concrete culvert pipe, lumber, gasoline. W. C. Otto, co. engr.

†FIRE HYDRANTS—**Portland, Me.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., taking bids fire hydrants at U. S. Marine Hospital.

AUTO PATROL, etc.—**Crystal Bay, Minn.**—May 5, by Town of Orono, c/o O. E. Johnson, town clk., 1 auto patrol or motor patrol with enclosed cab, scarifier and snow plow.

†PIPE LINE DREDGE—**St. Paul, Minn.**—June 3, by U. S. Eng., 615 Commerce Bldg., constructing 1 self-propelled 20 in. pipe line dredge.

†CYRESS LUMBER—**Vicksburg, Miss.**—May 5, by U. S. Engr., Box 667, 11,800 ft. B.M. rough air dried cypress lumber, f.o.b. Vicksburg.

REINFORCING STEEL—**Albany, N. Y.**—Apr. 20, by J. W. Williamson, procurement officer W.P.A., Federal Bldg., Elmira, 25 tons reinforcing steel for Letchworth State Park, for New York State Dpt. Parks, Albany. To exceed $1,000.

†CABLE—**Brooklyn, N. Y.**—Apr. 24, by Signal Corps, Procurement Dist., Army Base, 58th St. and 1st Ave., 600,000 lin.ft. submarine mine cable.

†WIRE, etc.—**Brooklyn, N. Y.**—Apr. 20, by Signal Supply Officer, 58th St. and 1st Ave., 10,000 ft. wire, f.o.b. to Army Base, here; 20,000 ft., f.o.b. San Francisco, Calif.; and 3,800 ft. switchboard cable, f.o.b. factory.

WIRE ROPE—**New York, N. Y.**—Apr. 22, by Dpt. Purchase, Municipal Bldg., steel wire rope to Dpt. Purchase.

STREET OIL, etc.—**Oneonta, N. Y.**—Apr. 20, by Bd. P. Serv., City Hall, street oil, cement, stone, gravel and gasoline for city requirements during summer 1936. To exceed $1,000. F. N. Gurney, city engr.

†STEEL FUEL OIL TANK, etc.—**West Point, N. Y.**—May 6, by Con. Q.M., West Point, 45,000 bbl. steel fuel oil storage tank; 2 compartment steel service tank; furnishing, erecting 2 boilers; furnishing, erecting new turbine, for improving power house. $160,000.

STEAM SHOVEL — **Waterloo, N. Y.** — Bd. Supervs. Seneca Co., Waterloo, taking bids steam shovel. $7,000. J. E. Hudson, Waterloo, co. engr.

DUMP TRUCKS — **Ridgway, Pa.** — Silicon Products Co., Ridgway, taking bids 3 ton and 6 ton dump trucks. To exceed $1,000.

TRACTOR—**Uwchland, Pa.**—H. E. Funderwhite, taking bids heavy-duty tractor for highway work, $1,200.

†PIER NOSES and HIGH PRESSURE GATES—**Wyoming**—Apr. 23, by Bureau Reclamation, Denver, Colo., pier noses and high pressure gates for outlet works at Bull Lake Dam, Riverton Project.

LOCOMOTIVE DERRICK—**Edmonton, Alta.**—Municipality, A. Ritchie, power plant supt., in market for locomotive derrick. $20,000 available.

CONTRACTS AWARDED

†GATE HOISTS, etc.—**Arizona**—Bureau Reclamation, Denver, Colo., 19 motor-driven radial gate hoists for Stewart Mountain Dam, Schedule 1, to Commercial Iron Wks., 412 Southeast Stephens St., Portland, Ore., $22,300***19 gate position indicators, Schedule 2, to Philips & Davies, Kenton, O., $419***altering 19 radial gates for installation in north and south spillways, Schedule 3, to J. W. Beam, Guardian Trust Bldg., Denver, Colo., $5,250. Grand total $27,969. Bids Feb. 27. Noted Feb. 20, C. D.

DISCONNECTING SWITCHES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Broadway, disconnecting switches, Spec. 1890, to each, 3,000 amp., 23 kv. 3 pole, two each 400 amp., 23 kv. 3 pole, to Bowie Switch Co., 19th and Tennessee Sts., San Francisco, $3,790. Bids Mar. 16, awarded Mar. 24.

LUMBER—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing 150,000 ft. BM 3x6 in. x 16 ft. No. 1 com. Douglas fir, Spec. 1908, to Daugherty Lumber Co., American Bank Bldg., Portland, Ore., $3,735. Bids Mar. 24, awarded Apr. 2.

†LUMBER—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., Douglas fir lumber, Proposal 513, to Chapman Lumber Co., Bd. Trade Bldg., Portland, Ore., $5,728. Bids Mar. 23, awarded Apr. 2.

PIPE—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., 10,000 ft. 14 in. 12 gage welded steel drive pipe, f.o.b. Mono Basin, Spec. 1918, to Lacy Mfg. Co., Washington Bldg., $8,200. Bids Apr. 1, awarded Apr. 2.

†ROAD PAVING MATERIALS—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 5,150 tons asphaltic concrete paving, 2,600 tons asphaltic concrete wearing surface, 3,900 gal. asphaltic paint binder, Proposal 525, to Asphalt Paving Materials Co., 3430 Moynier Lane, $18,704. Bids Mar. 30. Noted Mar. 25, C. D.

STORAGE BATTERIES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing 2 sealed glass jar, lead type storage batteries, Spec. 1872.

†Federal Government

Materials, etc. (Continued)

to Electric Storage Battery Co., 1043 South Grand Ave., $6,325. Bids Feb. 7, awarded Mar. 24. Noted Jan. 29, C. D.

GATE VALVES — **Oakland, Calif.** — J. H. Kimball, secy. East Bay Municipality Utility Dist., 512 16th St., furnishing twelve 6 in., twenty 8 in., nine 10 in., seven 12 in., two 16 in. gate valves, Spec. LS-168, to Iowa Valve Co., 501 Howard St., San Francisco, $1,725. Bids Mar. 25, awarded Apr. 6. Noted Apr. 3, C. D.

ASPHALT—**New Haven, Conn.**—City, Director P. Wks., furnishing, delivering as designated, [illegible]00 tons asphalt surfacing and 300 tons asphalt binder, to Webb Asphalt Paving Corp., 69 Middletown Ave., $2,500. Bids Mar. 31, awarded Apr. 1. Noted Mar. 27, C. D.

LEAD PIPE SLEEVES—**Chicago, Ill.—City,** City Hall, 13,600 lb. lead pipe sleeves various sizes, to National Lead Co., 900 West 18th St., $878; 2,000 ft. 2 in. and 25,000 ft. 2½ in. standard steel pipe, to Miller Supply Co., 2100 South Sawyer Ave., $9,447. Bids Mar. 18, awarded Apr. 5. Noted Mar. 26, C. D.

ANCHOR BOLT ASSEMBLIES—**Springfield, Ill.** — Div. Purchase & Supplies, Springfield, 25,000 expansion anchor bolt assemblies for state Highway Div., to American Expansion Bolt & Mfg. Co., 108 North Jefferson St., Chicago, $9,875. Bids Mar. 23, awarded Apr. 6. Noted Mar. 17, C. D.

STAKES — **Springfield, Ill.** — State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, 33,100 stakes, to Joseph Lumber Co., 3358 Belmont Ave., Chicago, $3,459. Bids Feb. 7. Noted Feb. 5, C. D.

CULVERT PIPE, etc.—**Burlington, Ia.**—Des Moines Co., K. M. Pfeiff, aud., 3,708 lin.ft. corrugated metal culvert pipe, 116 connecting bands, 15- to 36-in. diam., to Illinois Corrugated Culvert Co., Lehmann Bldg., Peoria, Ill., $3,292. Bids Apr. 6. Noted Apr. 1, C. D.

CREOSOTED LUMBER, etc.—**Davenport, Ia.**—Scott Co., A. O. Mirth, aud., 72,866 ft. BM creosoted lumber and 1,980 lin.ft. creosoted piling, to Wheeler Lumber Bridge & Supply Co., 606 Hubbell Bldg., Des Moines, $5,899. Bids Apr. 1. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

MOTOR PATROLS—**Cookston, Minn.**—Polk Co., 2 diesel motor patrols, to W. H. Ziegler Co., 2331 University Ave. S.E., Minneapolis, $5,164 each. Bids Mar. 16. Noted Mar. 11, C.D.

METAL CULVERTS — **Hastings, Minn.** — Dakota Co., furnishing corrugated metal culverts for 1936 season, to Northfield Iron Co., Northfield, and to St. Paul Corrugating Co., 3 West Water St., St. Paul, $2,602. Bids Mar. 16. Noted Apr. 1, C. D.—Mar. 5, E. N.-R.

†VALVES—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., ¼- to 2-in. valves, Lot 1, to D. T. Williams Valve Co., 2892 Spring Grove St., Cincinnati, O., $968; Lot 2, to Wilkerson Sales Co., 301 Minor Bldg., $113. Bids Mar. 19, awarded Apr. 1.

STONE, etc.—**New Jersey**—F. A. Brouesser, state purch. agt., Trenton, to Kingston Trap Rock Co., Kingston, 4770 tons cement and sand $1.73 per ½ ton, 4.825 tons ¾ in. stone $1.75 per ½ ton, 4,825 tons ½ in. crushed stone $1.73 per ½ ton***to Rednor & Kline, Morrisville, Pa., 15,552 tons sand and cement, 85c. per ton*** to Interstate Equipment Co., 18 West Jersey St., Elizabeth, 10,000 lin.ft. iron sheet metal $2.16 per ft.***to Standard Equipment Co., 582 steel joints, $4,355. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

ROAD MATERIAL—**Princeton, N. J.**—Mayor and Council, to Kingston Bituminous Products Co., Kingston, 25,000 gal. road material, seal coat 10c. per gal.; penetration tar, Grade B 10.7c. per gal.; penetration tar, Grade A 12c. per gal.; coal patch tar 11c. per gal. Bids Apr. 7.

PIPE — **Trenton, N. J.** — City Manager and Council, lead lined iron pipe for waterworks, to Delaware Valley Supply Co., 500 Southard St., $3,280. Awarded Apr. 1.

†PIPE—**New York, N. Y.**—Treas. Dpt., Procurement Div., 76 9th St., 660 tons c.i. pipe for various waterworks projects, to U. S. Pipe & Fdry. Co., Burlington, N. J., and to Florence Pipe & Machine Co., Florence, N. J.; 815 ft. 6- to 12-in. c.i. water lines on various W.P.A. jobs, to Warren Fdry. & Pipe Corp., Phillipsburg, N. J.

STONE, etc.—**Rochester, N. Y.**—City, City Hall, 6,000 tons stone and 10,000 tons limestone and screenings, to Dolomite Products Co., 183 Main St. E., $8,250 and $11,000 respectively***75,000 gal. fuel oil for municipal asphalt plant, to L. C. Langie Coal Co., 326 Main St. E., $3,937***3,500 tons broken stone, to LeRoy Lime & Crushed Stone Corp., LeRoy, $5,180***1,000 tons asphalt cement, to Atlantic Refining Co., Inc., 1840 Lyell Ave. $17,400. Grand total $45,767.

CREOSOTED TIMBER PILES, etc.—**Raleigh, N. C.**—Div. Purchase & Contract, A. S. Brower, dir., 50 creosoted timber piles, to Wood Preserving Corp., Up King St., Charleston, S. C., $615***1,000 creosoted sign posts, to Taylor-Colquitt Co., Spartanburg, S. C., $736***7,650 bd. ft. creosoted timber, to Gulf States Creosoting Co., Piedmont Bldg., Charlotte.

DRAG BLADES, etc.—**Raleigh, N. C.**—Div. Purchase & Contract, A. S. Brower, dir., 2,000 drag blades f.o.b. Raleigh, to Peden Steel Co., 512 West Hargett St., $4,090***1,000 drag blades f.o.b. Tarboro and 1,000 road machine blades f.o.b. Raleigh, to Job P. Wyatt & Sons, Inc., 325 South Wilmington St., $1,770 and $1,850 respectively***1,000 road machine blades f.o.b. Tarboro, to American Hardware & Equipment Co., 217 West 1st St., Charlotte, $1,885***100 creosoted timber piles, to Gulf States Creosoting Co., Piedmont Bldg., Charlotte, $1,100. Grand total $10,745. Bids Mar. 17. Noted Mar. 13, E. N.-R.

TRACTOR—**Fargo, N. D.**—Cass Co., F. F. Doherty, aud. furnishing 1 diesel-motored caterpiller type tractor, to Lewis Tractor & Mchy. Co., 64 4th St., North Fargo, $6,170. Bids Mar. 6.

†NEEDLE FLATS — **Cincinnati, O.** — U. S. Eng., 2 riveted needle flats, to Marietta Mfg. Co., Point Pleasant, W. Va., $4,160. Bids Feb. 11, awarded Apr. 1. Noted Feb. 17, C. D.—Jan. 30, E. N.-R.

COLD PATCH and TAR BASE—**Hollidaysburg, Pa.**—Comrs. Blair Co., cold patch, to Quaker Sales Corp., Johnstown; asphalt tar base, to Neville Co., Neville Island, Pittsburgh. Bids Apr. 1, awarded Apr. 1.

ASPHALT, LIMESTONE DUST, etc.—**Scranton, Pa.**—City, W. A. Schunk, dir. P. Wks., asphalt as required, to Warner Quinlan Co., 2 Park Ave., New York***limestone dust, to Solvay Process Co., Milton Ave., Syracuse, N. Y. ***ready mixed concrete, to Ezra Stipp, Scranton Real Estate Bldg., Scranton. Bids Mar. 18. Rejected bids Mar. 18, sand, will readvertise.

TAR PRIME — **Virginia** — Dpt. Hys., Richmond, furnishing 204,000 gal. tar, Lynchburg Dist., to Reilly Tar & Chemical Corp., Norfolk, $15,769***336,000 gal., Culpeper Dist., to Eastern Tar Products Corp., Baltimore, Md., $24,864***472,000 gal., Fredericksburg Dist., to Barrett Co., Margaret and Bermuda Sts., Phila., Pa., $36,013***100,000 gal., Richmond Dist., and 388,000 gal., Suffolk Dist., to Southern Asphalt Co., Inc., North Blvd. and Ellen Rd., Richmond, $7,470 and $28,052 respectively. Grand total $112,169.

CRUSHED ROCK—**Baraboo, Wis.**—City, furnishing crushed rock, to E. Kraemer, Plain, $1,890. Bids Mar. 25. H. C. Amundsen, engr.

†WATER PIPE, etc.—**Madison, Wis.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., c.i. water pipe for Grant Park, Milwaukee, to Ellsworth Pipe & Supply Co., 1739 West St. Paul Ave., Milwaukee, $1,614***structural steel, for Jacobus Park, Milwaukee, to C. Hennecke Co., 3225 North Pierce St., Milwaukee, $1,617*** boiler and radiator, f.o.b. Municipal Garage, Shorewood, to Wisconsin Plumbing & Heating Supply Co., 822 South 2nd St., Milwaukee, $700 and $399 respectively***unit heaters, to F. R. Dengel Co., 1134 North 4th St., Milwaukee, $299, all above material for W.P.A. projects. Grand total $4,629.

†PORTLAND CEMENT, etc. — **Milwaukee, Wis.**—Treas. Dpt., 525 bbl. Portland cement, to Pipkorn-Wallen Fuel & Supply Co., 7734 Harwood Ave., Wauwatosa, $2.50 per bbl.; 375 bags hydrated lime, to W. F. Luebke Co., 148 East Anderson Ave., at 34.75c. per bag, for W.P.A. projects.

PUMPS—**Sheboygan, Wis.**—City, furnishing sludge pumps, Contr. F-A, to Chicago Pump Co., 2336 West Wolfram St., Chicago, Ill., $1,448. Noted Feb. 28, C. D.—Mar. 5, E. N.-R., under "Sewerage and Waste Disposal."

FOREIGN

Australia—Corporation, c/o American Smelting & Refining Co., 120 Bway., New York, constructing low grade gold ore mining and milling project at Big Bell Mines, Province of Western Australia, separate contracts and day labor. **To exceed $150,000.**

Australia, Brisbane—Apr. 29, by Queenslands Railway Purchasing Agent, supplying 1 runabout crane. Tenders should be cabled and followed by formal tender.

Chile—Greiner & Cia. Ltda., Casilla 511, **Santiago,** in market for acetic acid, custom duty S/2.00 per gross kilo possibly 1,000 kilos*** Valparaiso Gas Co., Casilla 3779, **Valparaiso,** in market for gas fixtures and piping, cables "Gas." custom duty S/0.20 gross kilo.

England—London—Apr. 27, by G. F. Stringer, clk. Metropolitan Water Bd., 173 Rosebery Ave. E.C., manufacturing, delivering and erecting 1 high compression heavy fuel oil engine with vertical centrifugal high lift and bore pumps, electric generator and accessories at Green Street Station.

England, Portsmouth—Southern Railway Co., manufacturing, supplying and erecting twenty-seven 2,500 kw. steel cylinder type mercury arc rectifiers with main transformer auxiliary transformers, re-cooler equipment, control panels and accessories, each rectifier will be designed for normal d.c. kw. and will operate in conjunction with 33,000 volt three phase, 50 cycle oil immersed self-cooled transformer having output of 2,500 kw. at 660 volts with overload up to 8,000 kw., to Bruce Peebles Co. Ltd., Edinburgh, Scotland.

Liberia, Port Elizabeth—Firestone Tire & Rubber Co., 1278 South Main St., Akron, O., constructing rubber factory, separate contracts and day labor. $1,000,000.

Manchuria, Harbin—M. A. Genger, 43 Diagonalnaya St., interested in prices of dry colors, white lead, white zinc and lithopone. Customs **duty 12½% ad valorem.** Only the cheaper

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†Federal Government

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Smooth Operating
SEWERAGE AND FILTRATION EQUIPMENT

Valve troubles need no longer be a problem in sewerage disposal and filtration equipment. Install and rely on Ludlow gates and valves—built to last—smooth operating — positive acting — time-tested in nation-wide use. Complete information and quotations on request.

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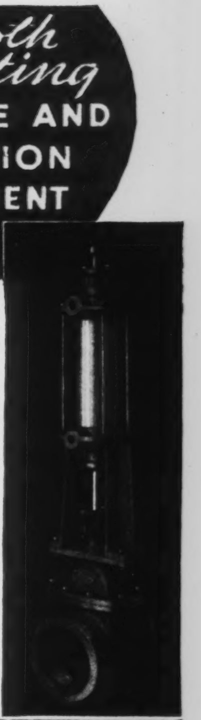

ELEVATED STEEL TANKS

This is one of two 500,000 gallon double ellipsoidal elevated tanks built last year for the water works department at La Porte, Ind.

This type of tank combines economy with beauty. Its high water line is well up in the roof, or upper ellipse. Its overall range of head (distance from full to empty) is very low. In general, for capacities from 250,000 gallons to 1,000,000, it is probably the best buy on the market today.

Pittsburgh DES MOINES STEEL COMPANY
3414 Neville Island, Pittsburgh
915 Tuttle St., Des Moines

Foreign (Continued)

grades of dry colors and prices should be quoted c.i.f. Dairen and Tientsin, and include 5% agent's commission. Small samples should be sent as also details of packing, shipping weights and measurements.

Scotland, Fife—County Council making plans constructing 1,000 houses. $1,500,000.

South Africa, Johannesburg—May 18, by T. H. Watermeyer, mgr. South African Railways & Harbours Administration, supplying structural steel for shed construction.

PUBLIC BUILDINGS

PROPOSED WORK

Ala., Montgomery—City, revised plans by F. Lockwood, 121 Adams St., and takes bids about May 1, 3 story, basement, 131x311 ft., brick, rein.-con. city hall. $475,000. P.W.A. project. Bids, Mar. 30, rejected. J. M. Garrett, city engr. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

★ **Calif., Los Angeles**—Los Angeles Co., election May 5, $4,000,000 bonds to help erect branch offices and county courts building, costing $6,000,000; plans branch office buildings, in Pomona, $180,000, Whittier $100,000, Belvedere $200,00, San Antonio Twp. $300,000, unincorporated portion of Beverly Hills, township incl. West Hollywood $15,000, Long Beach $600,000, Santa Monica $100,000, Inglewood Twp. $133,636, Compton $125,000, Pasadena $275,000, Glendale $150,000, Antelope Twp. $50,000.

Calif., Los Angeles—Los Angeles Bd. Educ., Chamber of Commerce Bldg., will not construct school district administration building. $425,000. Project abandoned.

Ga., Gainesville—Hall Co., c/o Bd. County Comrs., soon takes bids 2 story, basement, brick, stone court house. $140,000. Daniell & Bentell, Georgia Savings Bank Bldg., Atlanta, archts. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Ind., Valparaiso — Bd. Comrs. Porter Co., E. Stoner, aud., Valparaiso, plans by W. Scholer, 1114 State St., Lafayette, reconstructing 3 story, court house, Public Square, destroyed by fire. $150,000. Noted May 28 and June 6.

†Ky., Morganfield—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office, Main St.

Md., Rockville—Bd. Educ. Montgomery Co., soon takes bids 2 story, basement school and gymnasium. H. W. Cutter, 1108 16th St. N.W., Wash., D. C., archt. P.W.A. project.

Md., Woodside—Bd. Educ. Montgomery Co., Court House, Rockville, soon takes bids 2 story, basement elementary school. $150,000. P.W.A. project. H. W. Cutler, 1108 16th Ave. N.W., Wash., D. C.

N. Y., Moravia—State Commissioner of Education, Albany, has received petition for formation of Central School Dist., to include Moravia, Sempronius, Niles, Locke, Venice, Scipio and Summerhill. Central School Bd. will be formed if petition is granted and centralization approved by taxpayers. To exceed $140,000. Architect and engineer not appointed.

†N. Y., Rochester—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Mar. 13, remodeling U. S. Court House and elevators. Will revise plans and readvertise. Noted Mar. 17, C. D.—Feb. 20, E. N.-R.

★ **†N. Y., Schenectady**—P. Wks. Administration, Div. Housing, Wash., D. C., soon takes bids constructing foundation for Schonwee Village Housing Project, Project H-5801. Total $2,000,000. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

★ **N. Y., Syracuse**—Central New York Regional Market Authority, 525 Union Bldg., soon takes bids piling contract for regional market buildings. Bids later in 1936, for superstructure. Total $800,000. P.W.A. project. C. W. Clark, 27 North Main St., Cortland, engr. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

N. Y., White Plains—Bd. Supervs. Westchester Co., Court House, petitioned New York State Dpt. Military & Naval Affairs, Capitol Bldg., Albany, for allotment of state or federal funds for constructing new national guard armory. To exceed $140,000. W. C. Brush, c/o owner, chn. of committee on Armories & Militia, and in charge of negotiations for Westchester Co.

★ **Oregon** — State Armory Bd., 28 armories have been approved by P. Wks. Administration, approving grants as follows, which is 40% of cost of building: Pendleton, La Grande, Astoria, Forest Grove, Lebanon, The Dalles, all $46,370. St. Helena and Granite Pass, $45,000 each, Grisham, Springfield, Union and Hillsboro, $25,000 each, Salem, $236,231, Oregon City, $47,310; for repairs, etc.: Westport, $3,744, Roseburg, $2,736, College Grove, $550, Ashland, $1,480, McMinnville, $2,644, Tillamook, $2,050, Silverton, $3,474, Albany, $1,676, The Dalles, $3,484, Eugene, $2,236, Woodburn, $8,895, Marshfield, $5,006. Total $788,706 grant.

Pa., Dunmore—Dunmore School Dist., F. G. Scott, secy., revised plans by J. Howley, Scranton, 30 room high school. Bids Mar. 30, rejected. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

Okla., Alva—City defeated bonds constructing new electric power plant. $240,000. V. V. Long & Co., Colcord Bldg., Oklahoma City, engrs. Noted Sept. 25, C. D.—Oct. 3, E. N.-R.

Okla., Enid — School Bd. voted bonds constructing Junior High School. $250,000. R. W. Shaw, Enid, archt.

★ **Que., Montreal** — Dpt. National Health & Pensions, Ottawa, Ont., G. G. Power, minister, prepares plans military hospital replacing one at Ste. Anne de Bellevue. $1,500,000.

★ **Que., Rigaud**—Bourget College plans by J. M. Lafleur, Valleyfield, constructing addition to college buildings. $500,000.

BIDS ASKED

†Ala., Ozark—May 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $67,000. Noted Oct. 25, C. D.—Oct. 31, E. N.-R.

Ariz., Tucson—Apr. 27, by Bd. Regents University of Arizona, constructing power plant addition and erecting water tube boilers at university.

†Ark., Springdale—May 5, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

Conn., Ansonia — Apr. 24, by City, E. W. Webb, chn. School Comn., 3 story, basement, 154x303 ft., brick, steel, concrete high school, Howard Ave. and Crescent St. $423,000. W. Lescaze, 211 East 48th St., New York, archt. V. Searas, Ansonia, engr. Noted Mar. 11, C. D—Mar. 19, E. N.-R.

D. C., Wash.—Apr. 23, by District Comrs., District Bldg., constructing certain additions, incl. remodeling for Anacostia Junior High School. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

★ **D. C., Wash.**—Apr. 24 (extended date), by Treas. Dpt., Pub. Wks. Branch, Procurement Div., constructing additional buildings for U. S. Bureau of Engraving and Printing; and new building for Bureau of Economics, Dpt. Agriculture (also elevator plants in above buildings). $5,500,000. Noted Mar. 25, C. D.—Apr. 2, E. N.-R.

†Fla., Pensacola—Yards & Docks, Navy Dpt., Wash., D. C., taking bids 4 electric elevators at Naval Air Station, Spec. 8182. (Date not set.)

†Ga., Blakely—Apr. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,000; adv. E. N.-R., Apr. 16.

Ga., Gainesville—Apr. 29, by Bd. Comrs. Hall Co., 2 story, basement, concrete court house. $250,000. Daniell & Bentell, Georgia Savings Bank Bldg., Atlanta, archts.

Ind., Covington—May 5, by Bd. Comrs. Fountain Co., Z. A. Helms, aud., Covington, general contract 3 story, brick, steel court house, Public Square. $325,000. P.W.A. project. L. L. Johnson, Attica, archt. W. Scholer, 1114 State St., Lafayette, assoc. archt. Noted Dec. 24, C. D.—Jan. 2, E. N.-R.

†Ky., Fort Knox—Apr. 30, by Con. Q.M., Fort Knox, constructing 6 sets operators' quarters and maintenance building for filtration plant. $50,000; adv. E. N.-R., Apr. 16. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

†Md., Annapolis—Apr. 22, by Yards & Docks, Navy Dpt., Wash., D. C., painting quarters at Naval Academy (High Powered Radio Station), Spec. 8134.

†Md., Salisbury—May 7, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $195,000. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

†Mass., Cambridge—Apr. 21, by P. Wks. Administration, Housing Div., Wash., D. C., constructing foundations of Main Street Housing Project, Project H-8501. Bids Dec. 12 rejected. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

Minn., Minneapolis—Apr. 28, by P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundations for Sumner Field Project, Project H-4201. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

★ **Mo., St. Louis**—May 1, by Bd. P. Serv., City Hall, superstructure for 2 story, part basement, 89x191 ft. limestone, granite, rein.-con. soldiers memorial, between 13th and 14th Sts., Pine and Chestnut Sts. $1,000,000. Plaza Comn., Inc., c/o Mauran, Russell & Crowell, 1620 Chemical Bldg., archts. and engrs. Noted Dec. 6, C. D.—Dec. 12, E. N.-R.

†N. H., Portsmouth—Apr. 29, by P. Wks. Officer, Navy Yard, conversion of elevator in Building H-1, at Naval Hospital, from manual operated to full automatic single push button control, installing self-leveling devices and electrically operated car and hatchway gates, Spec. 8136.

★ **†N. Y., Bath**—May 19, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing Hospital Building 76, incl. heating, plumbing, electrical work, elevators, etc. $600,000.

★ **N. Y., Binghamton**—Apr. 27, by Bd. Educ., C. A. Harrell, city mgr., general contract, plumbing, heating, electrical work, for North High School. $900,000. P.W.A. project. L. W. Kaley, 70 Court St., archt. Noted Apr. 9, E. N.-R.

N. Y., Holland Patent—Apr. 21, by Bd. Educ., Central School Dist., general contract plumbing, heating, electrical work and painting school. $311,219. P.W.A. project. Kinne & Frank, 7 Hopper St., Utica, archts.; adv. E. N.-R., Apr. 16. Noted Mar. 19, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

N. Y., Jamestown—Apr. 20, by Bd. Educ., general contract Cole Avenue School. Noted Dec. 6, C. D.—Dec. 14, E. N.-R., under "Contracts Awarded."

N. Y., Jefferson—Apr. 21, by Bd. Educ., a office Principal of the High School, Jefferso for towns of Jefferson, Blenheim, Gilboa, Sun mit, Schoharie Co., and Harpersfield and Kor right, Delaware Co., general construction, hea ing, ventilating, plumbing and electrical wo for Jefferson Central School, Central Scho Dist. 1. $90,300. P.W.A. project; adv. E. N.-R Apr. 16. Noted Apr. 9, C. D.—Apr. 16, E. N.-

N. Y., New Brighton—Apr. 24, by W. Martin, archt. and supt. School Buildings, Fla bush Ave. Extension and Concord St., Brookly mechanical equipment (plumbing, draina heating, ventilating apparatus, electrical wo and lighting fixtures), in additions to Curt High School, Hamilton Ave. and St. Mark Pl., for Bd. Educ., 500 Park Ave., New Yor $215,000.

★ **†N. Y., New York**—May 12, by P. Wk Administration, Housing Div., Inter Bdg., Wash., D. C., constructing superstructur of Harlem River Houses Project H-1302, 7 Ave., Macomb Pl., Harlem River, 151st to 153 Sts. Total est. $4,700,000. Harlem-Macom Place Project Associated Architects, 139 Ea 39th St., archts. Noted Dec. 23, C. D.—De 26, E. N.-R., under "Contracts Awarded."

N. Y., New York—Apr. 22, by Dpt. Hospital 125 Worth St., plumbing, refrigerating and i making plant, brine line system, and alterin structure adjoining machine shop and for add tion to said structure adjoining in City Hom Dist., Welfare Island.

N. Y., Ogdensburg—Bd. Educ. taking bi general contract, heating, plumbing and ele trical work for school. $180,000. P.W.A project. Randall & Vedder, S. A. & K. Bldg Syracuse, archts.

N. Y., Perry—Apr. 28, by Union Free School Dist. 6, general contract, plumbing, heatin and electrical work for school, Park St. $42 000. P.W.A. project. Bids Mar. 12 rejected Bley & Lyman, 505 Delaware Ave., Buffalo archts. Noted Mar. 20, C. D.—Mar. 5, E. N.-R.

N. Y., Poughkeepsie — Apr. 22, by Lower Hudson Regional Market Authority, Newburgh filling, grading and paving Contr. A; constructing buildings, plumbing, heating and electrical work, incl. 1,000 gal. steel gasoline storage tank for gasoline service station. Contr. B for farmers' market. P.W.A. project. E. C. Smith, 34 Market St., archt.

N. Y., Rochester—Apr. 24, by Div. Purchase & Supply, City Hall, general contract constructing Rundel Memorial Building extensions. P.W.A. project. W. G. Kaelber, 311 Alexander St., archt.; adv. E. N.-R., Apr. 16. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., Spencer—Apr. 22, by Bd. Educ. Central School Dist. 1, general contract, plumbing, heating and electrical work for brick, steel school, plain found. $142,100. P.W.A. project. Conrad & Cummings, 99 Colliner St., Binghamton, archts.; adv. E. N.-R., Apr. 16. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

N. Y., Union Springs—Apr. 27, by Central School Dist. 1, Union Springs (towns of Springfield, Fleming, Aurelius and Ledyard and Scipio) general contract, plumbing, heating, electrical work for school. $254,000. P.W.A. project. C. W. Clark, Cortland, archt.; adv. E. N.-R., Apr. 16. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

†O., Eaton—May 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $69,000; adv. E. N.-R., Apr. 16.

†Okla., Oklahoma City—Apr. 29, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing detention cell in U. S. Post Office and Court House.

†Ore., Portland—May 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing detention cells in U. S. Court House.

★ **Pa., Phila.**—Apr. 22, by Bd. Educ., superstructure for vocational school, 9th and Mifflin Sts. Total est. $1,500,000. P.W.A. project. I. T. Catherine, Administration Bldg., archt. W. H. Gravell, 15th and Locust Sts., engrs. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

†Pa., Wayne—May 6, by P. Wks. Administration, Housing Div., Wash., D. C., constructing superstructures Highland Homes Project H-9001. Noted Dec. 23, C. D.—Dec. 26, E. N.-R. under "Contracts Awarded."

†S. C., Winnsboro—May 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

Tex., Anahuac—Apr. 22, by Chambers Co., c/o G. J. Jackson, judge, superstructure for 3 story, basement, 75x147 ft., brick, granite, cut stone, rein.-con. courthouse and jail. $180,000. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Tex., Galveston — Apr. 25, by John Sealy Hospital for Crippled Children, University of Texas, Austin, c/o Bd. Regents, 4 story, 50x130 ft., rein.-con. hospital. $200,000. P.W.A. project. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

†Tex., Galveston—U. S. Coast Guard, Wash., D. C., taking bids constructing 24 room, 1½ story, 65x200 ft., concrete coast guard station, incl. plumbing, wiring, heating. $80,000.

†Utah, St. George—May 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $69,000.

†W. Va., Welch—Apr. 29, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $145,000. Former contract rescinded. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

†Federal Government

Public Buildings (Continued)

†Wis., Prairie du Chien—Apr. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

†C. Z., Balboa—Yards & Docks, Navy Dpt., Wash., D. C., taking bids constructing three 4 family quarters at Naval Radio Station, Spec. 8120. (Date not set.)

†Uruguay, Montevideo—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Legation Building, for State Dpt., Wash., D. C. $160,000.

CONTRACTS AWARDED

†Ala., Birmingham—P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundation for Smithfield Court Housing Project, Project H-2720, to Southern Constr. Co., Inc., 615 South 11th St., $105,000. Bids Mar. 24. Noted **Mar. 30, C. D.—Mar. 19, E. N.-R.**

†Ariz., Yuma — U. S. Indian Service, Dpt. Interior, sketches by Mayers, Murray & Phillips, 2 West 47th St., New York, constructing Indian school at Yuma Indian Reservation. $80,000.

Calif., Avenal—Lemoore Union High School Dist. plans by W. H. Weeks, 593 Market St., San Francisco, rein.-con., steel high school. $150,000.

Calif., Los Angeles — Bd. Educ., to T. A. Rucker, 1012 South Adams St., Glendale, painting and miscellaneous work on main, classroom, annex, cafeteria and domestic science and mechanical arts building at John Muir Junior High School, 5929 South Vermont Ave., $9,320***to W. G. Thompson, 336 Church St., Pasadena, main building at San Gabriel Ave. School, 8628 San Gabriel Ave., South Gate, $1,198***to D. Zelinzky & Sons, 1438 East 18th St., administration building, domestic science and Shop Buildings 1 and 2, at David Starr Jordan High School, 2265 East 103rd St., $3,139; painting at Wilmington Park School, 1140 Mahar Ave., Wilmington, $4,380; at Torrance High School, Carson and Watson Sts., Torrance, $5,436; Leland St. School, Leland and 22nd Sts., San Pedro, $3,626; Orange St. School, 25902 Eschelman Ave., $2,638; at Gulf Avenue School, 1196 Gulf Ave., $2,396. Grand total $32,133. Awarded Mar. 26 and Mar. 30.

Calif., Sacramento—Sacramento City School Dist., plans by H. Devine, Cronan Bldg., brick auditorium, 1,500 seating capacity, (4th unit of Junior College Project). Est. $150,000.

Conn., New Britain—Michael A. Connor Co., general contractor, 15 Standish St., Hartford, finish for Roosevelt Junior High School, to New Britain Woodworking Co., 55 Pearl St., New Britain, for City, J. M. Ward, chn. Bd. Educ.***steel erection, to Berlin Constr. Co., Inc., Berlin***roofing, to G. R. Cummings Roofing Co., 198 State St., Meriden. Noted Mar. 10, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

†Ga., Brunswick—Apr. 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing 2 story, basement, 32x46 ft. dwellings and garage at St. Simons Island Coast Guard Station.

†Ga., Valdosta—Treas. Dpt. at office Sup. Archt., Wash., D. C., miscellaneous betterments at U. S. Post Office, to A. R. Means, 111 West Ashley St., Jacksonville, Fla., $5,190. Bids Mar. 24. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

†Ill., Chicago — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Postal Station Kedzie-Grace, to Hencke Constr. Co., 6 North Wells St., $129,598. Bids Mar. 20. Noted Mar. 24, C. D.—Feb. 2, E. N.-R.

†Ill., Quincy — Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling and constructing U. S. Post Office and Court House, to J. I. Barnes, Logansport, $172,790. Bids Mar. 10. Noted Mar. 16, C. D.—Feb. 20, E. N.-R.

Me., Augusta—State, Dpt. Health & Welfare, Dr. H. C. Hanscom, dir., State House, 3 story, basement, 72x320 ft., brick, steel, stone, granite dormitory, concrete found., incl. heating, plumbing, electrical work and elevator, at State Hospital, to F. W. Cunningham & Sons, 181 State St., Portland, $351,422. **P.W.A.** Bids Feb. 4, awarded Apr. 7. Noted Feb. 10, C. D.—Jan. 16, E. N.-R.

Me., Bangor—State, Dr. H. C. Hanscom, dir. Dpt. Health & Welfare, State House, Augusta, 4 story, basement, 36x148 ft., brick, steel, stone, granite nurses dormitory addition, incl. heating, plumbing and electrical work, concrete found., at State Hospital, to W. H. McPherson, 22 Hodsdon St., about $123,900; 5 story, basement, 36x116 ft. and 34x120 ft., brick, steel, stone, granite wing for female patients at State Hospital, incl. heating, plumbing and electrical work, to F. W. Cunningham & Sons, 181 State St., Portland, about $312,487. Bids Mar. 3, awarded Apr. 7. Noted Mar. 10, C. D.—Feb. 20, E. N.-R.

Mass., Holyoke—City, J. J. Fitzgerald, mgr. Municipal Gas & Electric Dpt., City Hall, carpentry and masonry work for flood repairs to present 2 story, basement, municipal gas and electric buildings on Connecticut River, to Daniel O'Connell & Sons, 480 Hampden St., to M. J. Walsh & Son, Shawmut Ave., Holyoke and to P. J. Kennedy, Holyoke; heating and plumbing, to Holyoke Valve & Hydrant Co., 150 Race St., Holyoke. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

†Mass., Worcester—Treas. Dpt. at office Sup. Archt., Wash., D. C., general contract 1 story, basement, 113x226 ft., brick, steel, granite parcel post building, concrete found., Harding and Franklin Sts., to Pooryu-Heenan Constr. Co., 51 Cornhill, Boston, $151,000. Bids Mar. 17, awarded Apr 7. Noted Mar. 19, C. D.—Feb. 20, E. N.R.

★ **Mich., Ann Arbor**—University of Michigan, brick, steel, stone, rein.-con. college graduate building for H. H. Rockham School, to W. E. Wood Co., 4649 Humboldt St., Detroit. Est. exceeds $500,000. Smith, Hinchman & Grylls, Marquette Bldg., Detroit, archts. Noted Dec. 12, C. D.—Dec. 19, E. N.-R.

Minn., Hutchinson—City, power building and appurtenances, to Electric Equipment Co., 207 Grand Ave., Des Moines, Ia., $41,500***equipment, to Donovan Constr. Co., 1725 Carroll Ave., St. Paul, $114,367***switchboard, to Electric Eng. & Constr. Co., 225 Walnut St., Des Moines, Ia., $7,500***distribution system, to L. A. Kepp Contg. Co., Rochester, $50,663. Grand total $214,030. Bids Mar. 18. Noted Apr. 1, C. D.—Mar. 12, E. N.-R.

Minn., Rochester—City, turbine generator for electric light and power plant, to Westinghouse Electric & Mfg. Co., 2303 Northeast Kennedy St., Minneapolis, $177,600***condenser, to Foster-Wheeler Corp., 20 North Wacker Dr., Chicago, Ill., $41,852***wiring, to L. A. Kepp Contg. Co., Rochester, $17,688. Grand total $237,140. Bids Apr. 12. Noted Feb. 20, C. D. —Feb. 27, E. N.-R.

Minn., Rochester—City, Public Utility Bd., T. R. Lawler, secy., general contract library, 3rd Ave. and 2nd St. S.W., to G. Schwartz, Rochester, $131,320***plumbing and heating, to Sanitary Co., Rochester, $14,200***ventilating, to Woodhouse Bros., Rochester, $3,993*** wiring, to Rochester Electric Co., Rochester, $4,830***painting and decorating, to E. A. Danewick, Rochester, $3,237. Grand total $157,580. **P.W.A.** Bids Mar. 12. Noted Mar. 5, C. D.

★ **N. H., Nashua—City, I. D.** Ravenelle, clk., E. T. Tracy, supt. Schools, City Hall, 4 story, basement, 52x320 ft. Senior High School, having 57x110 ft. wing, 2 story, basement, 76x147 ft. auditorium and 2 story, basement, 63x109 ft. gymnasium, to E. J. Pinney Co., Inc., 220 Dwight St., Springfield, Mass., general contract $283,020, and separate contracts $257,758. Total $540,778. General contractor awarded sub-contracts heating, to V. J. Kenneally Co., 251 Causeway St., Boston, Mass.***plumbing, to Wm. H. Mitchell & Son Co., 90 Arch St., Boston, Mass.***electrical work, to Barnes, Pope Co., 98 Brookline Ave., Boston, Mass. Bids Mar. 10, awarded Apr. 1. **P.W.A.** Noted Mar. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Andes—Central School Dist. 2, bids in July, constructing school. $142,500. P.W.A. project. H. C. Fullerton, 152 Washington Ave., Albany, archt. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

N. Y., Berlin — Rathgeb-Walsh Corp., Portchester, structural steel for school, for Bd. Educ. Central School Dist. 1, to James McKinney & Son, North Bway., Albany; reinforcing fabric and steel joists, to Truscon Steel Co., 155 East 44th St., New York. **P.W.A.** Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

N. Y., Brentwood—Dpt. Mental Hygiene, State Office Bldg., Albany, general contract industrial building, storage building, tunnels, etc., at Pilgrim State Hospital, to Caye Constr. Co., 356 Fulton St., Brooklyn, $244,800***heating, to Astoria Heating Co., 4151 70th St., Woodside, $13,500***sanitary work, to R. T. Frye & Co., 11 East 44th St., New York, $9,400***electrical work, to C. A. Mulligan, Central Islip, $18,740***electric elevator, to Otis Elevator Co., 130 Clinton St., Brooklyn, $3,270. Grand total, $289,710. General contractor awarded 125 tons reinforcing steel, to Jones & Laughlin, 30-02 Riverside Ave., Long Island City. Bids Dec. 3.

N. Y., Buffalo—C. H. Everitt, general contractor, 2095 Auburn Ave., cut stone for county office building West Eagle St., for Bd. Supervs. Erie Co., County Hall, to Loomis Cut Stone Co., 1776 Elmwood Ave.***miscellaneous and ornamental iron, to Weistenstein Iron Wks., 13 Eureka St. **P.W.A.** Noted Jan. 24, C. D.—Jan. 3, E. N.-R., under "Contracts Awarded."

†N. Y., Cooperstown—S. Plato, general contractor, 404 East Bway., Kokomo, Ind., awarded structural steel for U. S. Post Office, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Concrete & Steel Supply Co., Erie, Pa.***marble and tile, to Tiede-Zoeller Tile Corp., 2227 Delaware Ave., Buffalo***carpentry work, to R. M. Burgess Co., Inc., 23 Mynderse St., Schenectady. Noted Sept. 16, C. D.—Aug. 22, E. N.-R.

N. Y., Dannemora — Dpt. Correction, State Bldg., Albany, general contract administration building, cell block and service connections, Clinton Prison, to Amsterdam Building Co., 110 East 42nd St., New York, $340,987*** heating, to E. W. Tompkins, 22 Market St., Albany, $18,570***electrical work, to O'Connell Electric Co., 63 Mount Hope Ave., Rochester, $13,225. Grand total $372,812. **P.W.A.** Bids Mar. 5. Rejected bids Mar. 5, electric fixtures. New bids Apr. 8 for plumbing. Noted Mar. 12, C. D.—Feb. 20, E. N.-R.

N. Y., Fleischmanns—J. T. Kane, general contractors, 25 Parsons St., Binghamton, metal lathing and plastering for school, for Bd. Educ. Union Free School Dist. 21, to J. F. Parsons, 21 Dickinson Ave., Binghamton, about $12,000. **P.W.A.** Bids Nov. 8. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., Glens Falls—Duplex Constr. Co., general contractors, 149 Glen St., reinforcing steel for school, Sagamore Ave. for Union Free School Dist. 1, to Albany Steel & Iron Co., Troy Rd., structural steel, to J. McKinney & Sons, 925 Bway., Albany. **P.W.A.** Noted Mar. 30, C.D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Glens Falls—Duplex Constr. Co., general contractors, 148 Glen St., reinforcing steel for school, Lawrence St., for Union Free School Dist. 18, to Albany Steel & Iron Supply Co., Troy Rd., Albany, structural steel, to J. McKinney & Sons, 925 Bway., Albany. **P.W.A.** Noted Mar. 30, C.D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Gloversville—Duncan & Cahill, general contractors, 3276 6th Ave., Troy, reinforcing materials for school for Bd. Educ., Gloversville, to Truscon Steel Co., Youngstown, O. **P.W.A.** Noted Feb. 24, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

†N. Y., LeRoy—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, Main St., to Werner Spitz Constr. Co., 11 Comfort St., Rochester. Noted Mar. 23 C. D.—Mar. 26, E. N.-R.

N. Y., Newburgh—W. L. Crow Constr. Co., general contractors, 101 Park Ave., New York, 200 tons structural steel for school, for Bd. Educ., to Bethlehem Steel Corp., Bethlehem, Pa. Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

★ **N. Y., New York—Bd. Educ., 500 Park Ave., constructing Bronx Industrial High** School, to Comstock Constr. Co., 521 5th Ave. $886,600. **P.W.A.**. Bids Mar. 25. Noted Mar. 26, C. D.—Mar. 19, E. N.-R.

N. Y., Schoharie—A. Panziere, Inc., general contractors, Terminal St., Albany, reinforcing steel for county jail, for Bd. Supervs., Schoharie Co., to Albany Steel & Iron Co., Inc., Troy Rd., Albany. **P.W.A.** Noted Mar. 23, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

Ore., Warm Springs — City, electrical work for Warm Springs Hospital, to Le Page McKenny & Co., 115 Northwest 9th St., Portland, $3,050; heating, to H. C. Hastorf, Inc., 735 Southeast Morrison St., Portland, $26,200. Noted Mar. 6, C. D.

R. I., Cranston—City, Bd. Contr. & Supply, H. L. Schofield, purch. agt., City Hall, general contract 3 story, basement, 58x154 ft. and 38x55 ft., city hall, to E. Turegon, 36 Exchange Pl., Providence, $174,733***heating, to Frank Dupuis Co., 599 Main St., Pawtucket, $13,691***plumbing, to T. R. Douglas, 8 Slocum St., Providence, $8,035***electrical work, to H. J. Carroll, 71 Boyce Ave., Pawtucket, $11,675. Grand total $208,134. **P.W.A.** Bids Mar. 11, awarded Apr. 2. Noted Mar. 18, C. D.—Feb. 13, E. N.-R.

R. I., Howard (Cranston)—M. C. Hanson Co., general contractor, 100 Pleasant St., Malden, Mass., structural steel, metal sash for storage building at State Hospital, for State Emergency P. Wks. Comm., State House, Providence, to Providence Steel & Iron Co., 27 Sims Ave., Providence***painting, to Ernest P. Elmstrom, Inc., 14 Morton St., Malden, Mass.***heating and plumbing, to Lappin Bros. Co., 17 Irving St., Malden, Mass.***sheet metal, to Providence Cornice Co., 309 Canal St., Providence. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

R. I., Howard (Cranston)—Matthew Cummings Co., general contractors, 43 Tremont St., Boston, Mass., limestone for Women's Ward Buildings C and D, at Mental Hospital, to Indian Hill Stone Co., 184 Boylston St., Boston, Mass., for State, State House, Providence***structural steel, to Bethlehem Fabricators, Inc., 8th St. and Lehigh Ave., Bethlehem, Pa.***hardware, to Dudley Hardware Co., 192 Dudley St., Roxbury, Mass.***Knapp metal trim, to W. J. Grosvenor & Co., 270 Cedar St., Somerville, Mass.***roofing and sheet metal, to Providence Cornice Co., 309 Canal St., Providence*** granite, to Alex Thomson, Inc., 36 Albany St., Cambridge, Mass.***marble, terrazzo and asphaltic tile, to New England Marble Co., Inc., 268 Hartford Ave., Providence***laundry chute, to Lambert-Sawyer Co., 80 Boylston St., Boston, Mass.***millwork, to L. Vaughn Co., 1153 Westminster St., Providence***glass and glazing, to Federal Glass & Storefront Co., 81 Carpenter St., Providence***screens and weatherstrips, to R. A. Di Saia, 174 Bridgham St., Providence***waterproofing and dampproofing, to Travers & Sandell, Inc., 238 Main St., Cambridge, Mass.***painting, to H. Newton Marshall Co., 522 Harrison Ave., Boston, Mass. **P.W.A.** Noted Feb. 26, C. D.—Mar. 5, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—De Sandro Bros., general contractors, 106 Langdon St., Providence, reinforcing steel for administration building at State Hospital, to Truscon Steel Co., 38 Chauncy St., Boston, Mass., for State, Emergency P. Wks. Comn., State House, Providence ***structural steel, light iron, to Central Iron Wks., 33 Magnolia St., Providence***roofing and sheet metal, to Eagle Cornice Co., 314 Blackstone St., Providence***plaster, to J. L. Olivier, 203 Harrison St., Providence***paint, to F. O'Donnell, 18 Stokes St., Providence*** doors, windows, to Jos. Charpentier Mfg. Co., South Attleboro, Mass.***floors (tile terrazzo), to Cull & Williams Co., 272 Washington St., Providence***limestone, to Alex Thomson, Inc., 36 Albany St., Cambridge, Mass.***hardware, to Dudley Hardware Co., 124 Dorrance St., Providence. **P.W.A.** Noted Feb. 3, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

†Tenn., Memphis—Treas. Dpt. at office Sup. Archt., Wash., D. C., installing passenger elevator in ward building, in U. S. Marine Hospi-

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†Federal Government

Public Buildings (Continued)

tal, to Shepard Elevator Co., 2413 Colerain Ave., Cincinnati, O., $7,560. Bids Mar. 17. Noted Mar. 19, C. D.—Feb. 20, E. N.-R.

★ **Tex., Fort Worth**—City, c/o G. D. Fairtrace, mgr., superstructure 1 story, 232x405 ft., brick, steel, rein.-con. coliseum building, Centennial Grounds, to Jas. T. Taylor Co., 1st National Bank Bldg., $459,089. Est. $308,300. **P.W.A.** Noted Mar. 24, C.D.—Feb. 27, E. N.-R.

†Tex., Laredo — Treas. Dpt. at office Sup. Archt., Wash., D. C., installing 1 passenger elevator and 1 sidewalk elevator in U. S. Post Office, to Montgomery Elevator Co., 30 20th St., Moline, Ill., $7,284. Bids Mar. 27. Noted Apr. 1, C. D.—Mar. 12, E. N.-R.

Tex., Fort Worth—City, c/o G. D. Fairtrace, mgr., superstructure 1 story, 209x232 ft., brick, rein.-con. auditorium, Centennial Grounds, to R. F. Ball Constr. Co., 300 South Main St. Est. $318,000. **P.W.A.** Bids later for plumbing and heating. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Utah, Logan—Cache Co. School Dist., general contract constructing (1st unit), College Ward School, to Moser & Hill, Logan, $26,315; plumbing and heating, to A. H. Palmer & Sons, Logan, $5,730. Total est. $213,000. **P.W.A.** K. Schaub, Logan, archt. Noted Mar. 31, C. D.

Va., Occoquan—Arlington Co. plans hydro-electric power plant. To exceed $100,000. **Maturity indefinite.** Wiley & Wilson, Lynchburg, engrs.

†Vt., Springfield—William MacDonald Constr. Co., general contractors, 3829 West Pine Blvd., St. Louis, Mo., heating and plumbing for U. S. Post Office, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to W. W. Durnall, Lakeland, Fla.***electrical work, to G. Griffin, 4 Washington St., Malone, N. Y.***plastering, to Williamsport Plastering Co., Box 734, Williamsport, Pa.***miscellaneous iron, to Mona Mfg. Co., 3512 Chouteau Ave., St. Louis, Mo.***cast stone, to Archt. Stone Co., Avenue A, Turners Falls, Mass.***marble and terrazzo, to Colonial Marble Co., 414 A Gore St., Cambridge, Mass. Noted Nov. 22, C. D.—Nov. 28, E. N.-R., under "Contracts Awarded."

W. Va., Kanawha City—Charleston Educational Center sketches made by L. T. Bengston, Charleston, administration and physical education buildings, on 118 acre site, MacCorkle and Eighth Aves. $350,000.

Wis., Wauwatosa—W. L. Coffey, mgr. Milwaukee Co. Institutions, furnishing electrical equipment for central laundry building, to Stoff Electric Co., 1659 West Jackson St., Milwaukee, $4,700***soft tile floors in nurses' residence, to Middleton Floor Co., Inc., 1612 North 3rd St., Milwaukee, $521. Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

Alta., Calgary—Dpt. National Defence, Ottawa, Ont., constructing officers' mess and single officers' quarters, to Smith Bros. & Wilson Ltd., Regina, Sask., $125,000 plus; constructing guard room and meter building, to Bennett & White Constr. Co. Ltd., Calgary, $32,185. Noted Oct. 16, C. D.—Oct. 24, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

★ **Calif., Laguna Beach**—Laguna-Riviera Hotel Co., A. Violette, J. Lucas, C. C. Drake, A. Becigneul and M. Violette, directors, all of Laguna Beach, plan hotel and recreation center on property recently acquired, Heisler Point, north end of beach. Est. about $1,000,000.

Calif., San Francisco—Roman Catholic Archbishop, 1100 Franklin St., plans by H. A. Minton, 525 Market St., 3 story, rein.-con. parochial school, Broadway and Franklin St. $150,000. L. H. Nishkian, 525 Market St., engr.

Calif., West Los Angeles—Twentieth Century-Fox Film Corp., 10260 Orton Ave., plans 1 story, 135x212 ft. and 135x240 ft., steel, frame sound stages, 10260 Orton Ave. Est. about $175,000. Private plans.

Conn., Bristol—Sessions Associates, Morningside Tract, Oakland St., plans by Sperry & Buell, Inc., 175 Main St., residential development, incl. construction of 2 streets for 43 building sites, 4 residences to be started at once, Oakland St. To exceed $140,000. Excavation awarded to Innes Bros., Clay St., Thomaston.

Conn., New Haven—B. F. English, P. O. Box 365, sketches by Dwight E. Smith, 152 Temple St., 1 story, 55x130 ft., brick, steel fireproof theatre building.

La., New Orleans—Wogan & Bernard, 318 Carondelet St., engrs., soon lets contract installing air conditioning system in Monteleone Hotel.

Mo., St. Louis—Leko Realty Co., c/o S. Levin, 417 Pierce Bldg., 4th and Pine Sts., soon lets contract 1 and 2 story, 97x205 ft., rein.-con., brick, steel theatre and store building, Grand Blvd. and Natural Bridge Ave. $175,000 with site. R. Boler, 7332 Brooklyn Ave., Kansas City, archt.

N. J., Ventnor—Ventnor Theater Co. plans theater and stores. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

N. Y., Albany—Our Lady Help of Christians, Roman Catholic Church, c/o Gander, Gander & Gander, archts., 17 Steuben St., plans brick, steel parochial school, convent and chapel, plain found., 2nd Ave. $150,000. **Maturity about May 15.**

N. Y., Baldwinsville—F. W. Van Wie, 10 East Genessee St., bids in May constructing block of stores, offices, etc., Oswego St. W. B. Kingslow, Baldwinsville, archt. H. F. Connell, Baldwinsville, engr.

N. Y., Bayside—S. Goldstein, 215 Montague St., Brooklyn, plans by M. A. Cantor, 373 Fulton St., Brooklyn, constructing group 2 story, brick dwellings, 48th Ave. and 212th St. $140,000.

N. Y., Brooklyn—Sister Adorers of Precious Blood, 5302 Fort Hamilton Parkway, plans by W. J. Boegel, 13 East 37th St., New York, altering church and monastery, 5302 Fort Hamilton Parkway. $140,000.

N. Y., Buffalo—Y.M.C.A. Com., 45 West Mohawk St., soon lets contract constructing, installing steam heating system, electrical wiring and fixtures, altering interior building, complete reconditioning of elevators. To exceed $17,750. North & Shilgren, Crosby Bldg., engrs.

★ **N. Y., Eastchester**—Corporation, c/o H. D. Whittle, Mount Vernon, purchased all property of Oak Ridge Golf Club on White Plains Post Rd. and Mill Rd., and plans constructing 200 residences. To exceed $1,000,000. Private plans.

N. Y., Flushing — Klein & Jackson, 37-21 82nd St., Jackson Heights, plans constructing frame dwellings and constructing sub-division of tract, Bayside Ave., Willets Point Blvd. and 149th St. To exceed $250,000. Site acquired.

N. Y., Little Neck—A. Goegel, 85-35 Parson Blvd., Jamaica, plans by W. P. LaValle, 132-17 106th St., Ozone Park, constructing group 2 story, frame dwellings, Overbrook Pl. $140,000.

N. Y., New York—Fifth Avenue and 12th Street Corp., 55 5th Ave., plans by Minogue & Palmer, 17 East 49th St., altering heating and plumbing in apartment, 337 East 16th St. $40,000 with fixtures.

N. Y., St. George—New York City Housing Corp., c/o F. H. Crabtree, 551 5th Ave., New York, plans group brick dwellings, Livingston Heights. $140,000.

N. Y., Syracuse—P. Hueber, archt., 212 Harrison St., soon lets contract 2 story, basement convent, West Colvin St., for St. Anthony of Padua Roman Catholic Church, 1605 Midland Ave. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

N. Y., Valley Stream—A. W. Marjey, c/o Yorkshire Homes, Sunrise Hy., plans group brick dwellings, Sunrise Hy. $140,000. Private plans.

N. Y., Winfield—Woodside Homes Corp., 60-09 Woodside Ave., Woodside, plans by S. M. Palm, 159-15 Northern Blvd., Flushing, group 2 story, brick dwellings, 67th St. and 49th Ave. $140,000.

Okla., Claremont—Oklahoma Military Academy, Claremont, plans military academy. $450,000. J. D. Forsythe, Tulsa, archt.

★ **Tex., Harlingen** — Young Men's Co-Operative Assn., c/o L. I. Powell, Shreveport, La., surveys, preliminary plan, etc., underway, for farm development buildings and improvement project, consisting of fireproof, 1,000 capacity living quarters building, administration building headquarters, storage barns, library, radio broadcasting station, machine shop fully equipped for general motor and machinery repairing, dairy buildings equipped with modern machinery and equipment, cheese plant, milk products plant, cotton gin, cotton oil mill, etc. $2,000,000.

Tex., Houston—L. S. Weil and W. Moses, engrs., 427 South Peters St., New Orleans, La., soon lets contract installation of 160 tons of air refrigerating equipment, with all ducts, ventilators, wiring and necessary building changes in store, for S. H. Kress Co.

Tex., Sinton—Hall Industries Theatres, c/o H. Hall, pres., Beeville, will take competitive bids when plans by H. P. Smith, National Bank of Commerce Bldg., San Antonio, are completed for 1 story, part basement, balcony, modernistic style theatre, incl. plumbing, heating, wiring, air conditioning, acoustics, etc.

Ont., Timmins—Timmins Catholic Church, Rev. Thereault, pastor, plans by Henri Sicotte Labelle, Montreal, Que., constructing new church to replace one destroyed by fire. $140,000-$150,000. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

BIDS ASKED

N. J., Teaneck—See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Elmhurst—See "Contracts Awarded."

N. Y., Elmira—Elmira Savings Bank, Water St., bids about May 1, general contract bank, Water St. $150,000. R. T. Bickford, 215 West Water St., archt. Halsey, McCormack & Helmer, 286 5th Ave., New York, archts on bank equipment layout. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

N. Y., Fallsburg—A. H. Okun, archt., 16 Star Ave., Monticello, N. Y., taking bids 2 story, 58x129 ft. theatre and ballroom, for owner, c/o architect.

N. Y., Middletown—Apr. 27, by R. Graham, archt., 25 Prospect St., constructing telephone building, 19 John St., for Orange County Telephone Co., 19 John St. E. W. Seelye & Co., 101 Park Ave., New York, engrs. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., New York—See "Contracts Awarded."

★ **N. Y., Syracuse**—Apr. 29 (extended date), by Syracuse University, College of Medicine, general contract, heating, plumbing, electrical work for Medical College. $825,000. P.W.A. project. Dwight James Baum, Riverdale-on-Hudson, and New York City, archt. Not Mar. 24, C. D.—Mar. 26, E. N.-R.

CONTRACTS AWARDED

Calif., Santa Cruz—Salih Bros., general co tractors, 25 Taylor St., San Francisco, str tural steel for 2 story, rein.-con. theatre, Pac Ave., to Schrader Iron Wks., 1247 Harris Ave., San Francisco, for Pacific Amusem Co., 25 Taylor St., San Francisco***lumber, Hepburn Lumber Co., Santa Cruz***reinforc steel, to Soule Steel Co., 1750 Army St., S Francisco***gravel, to Central Supply C Santa Cruz. Noted Feb. 17, C. D.—Feb E. N.-R., under "Contracts Awarded."

Calif., West Los Angeles—Twentieth Centu Fox Film Corp., 10260 Orton Ave., 3 sto 90x280 ft., rein.-con. property storage bu ing, to Myers Bros., 3407 San Fernando R Los Angeles, $197,234. Noted Apr. 3, C. D.

Conn., Bridgeport—Hewlett Co., general co tractors, 1385 Iranistan Ave., sheet metal f school and convent units, Colorado Ave., Chas. Schroeder & Son, 898 Norman St., f St. Anthony Parish, A. A. Jalbert, pastor*** miscellaneous iron, to Wells Architecture C 295 East 133rd St., New York***cast sto to Dextone Co., 166 Chapel St., New Hav ***kalamein doors, frames, to Triangle Ma rial Products Co., Russell St., Brooklyn, N. ***asphalt tile floors, to Thomas Mould Floor Co., Grand Central Terminal, New Yo ***tile, to Architectural Tile & Terrazzo C 1020 Congress Ave., New Haven***electri work, to George J. Steinhardt, Inc., 1389 Ma St.***steel, to Porcupine Co., Post Rd., Fa field***roofing, to Thompson Roofing Co., 78 Housatonic Ave.***painting, to A. Wilkes, 1 Sherwood Ave.***millwork, to City Lumb Co., 75 Third St. Noted Mar. 19, C. D.—Ma 26, E. N.-R., under "Contracts Awarded."

Conn., Bristol—See "Proposed Work."

Md., Hagerstown—Montgomery Ward & Co Hagerstown, 150 tons structural steel for stor to Jones & Laughlin Steel Corp., 3rd Ave. an Ross St., Pittsburgh, Pa. Noted Feb. 19, C. D —Feb. 27, E. N.-R., under "Contracts Awarded

Minn., Minneapolis — Donaldson Realty Co c/o Magney & Tusler, archts., 104 South 9t St., excavating for 2 story, 154x165 ft. stor and office building, 8th St. and 2nd Ave. S to Johnson, Drake & Piper, 1138 Baker Bld Total est. $200,000.

N. J., New Brunswick—Walter Reade, theater, Albany St., to A. Milne, Plainfield. Est $400,000. T. W. Lamb, 701 7th Ave., New York, archt.

N. J., Teaneck—Modern Home Builders, Inc A. Paterno, owner, 250 Park Ave., New York 60 residences on new development near Knickerbocker Country Club, day labor and separate contracts. Est. $250,000 or more.

★ **N. J., Teaneck—L. Gold Co., 122 East 42nd St., New York, and Teaneck, N. J.,** 200 residences in new development known as Colonial Village. To exceed $500,000. Owner will design, build and buy all materials. C. Gold is also interested. Noted Jan. 14, C. D. — Jan. 16, E. N.-R.

N. Y., Brooklyn—Corporation, c/o Watson, Kristeller & Swift, 68 William St., New York, group 1 and 2 story, brick dwellings, Avenue W, day labor and separate contracts. To exceed $140,000. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Brooklyn—Park Homes, Inc., 66 Court St., constructing group 2 story, brick dwellings, Stuart St. and Avenue S., separate contracts and day labor. $140,000. B. Driesler, Jr., c/o owner, archt. Owner purchasing materials. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

N. Y., Elmhurst—C. X. Mathews Co., Lincoln and Roosevelt Aves., Woodside, group 2 story, brick dwellings, Ankener Ave. near Calamus Ave., day labor and separate contracts. $300,000. Private plans. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

N. Y., Forest Hills—Kent Homes, Inc., 66-72 Fresh Pond Rd., Ridgewood, constructing group 2 story, brick dwellings, separate contracts now being awarded. $140,000. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

N. Y., Jamaica—John Mullins & Son, 84 Myrtle Ave., general contract, 6 story, store addition, Jamaica Ave. and 168th St., to Tidewater Building Co., 101 Park Ave., New York. Est. $250,000. General Contractor awarded contract for 250 tons structural steel, to Harris Structural Steel Co., 419 4th Ave., New York. Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

N. Y., New York—F. Heidelberger, 2308 University Ave., 6 story apartment, 183rd St. and University Ave., separate contracts. $140,000. S. V. Becker, 819 East 169th St., archt. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

N. Y., New York—Metropolitan Savings Bank, 754 Bway., altering heating, plumbing in 6 story apartment and store buildings at 348 East 3rd St., 25 Third Ave., 166 Lewis St. and 1440 Park Ave. Separate contracts awarded. To exceed $50,000. A. A. Tearle, 155 East 44th St., archt. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. Y., New York—Raleigh Apartments, Inc., 324 East 196th St., 6 story, brick apartment, plain found., Davidson Ave. and 190th St., separate contracts now being awarded. $280,000. C. Kreymborg, 349 East 149th St., archt. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Ont., Ottawa—Edgar Proulx & Co. Ltd., general contractors, 621 St. Patrick St., iron work for rein.-con., brick apartment, Somerset St. W.,

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†Federal Government

Commercial Buildings (Continued)

for H. Blackburn, 294 St. Joseph Blvd., Hall, Que., to Ottawa Iron Wks. Ltd., 96 Nelson St.; elevator, to Otis-Fensom Elevator Co. Ltd., 254 Queen St. Noted Mar. 18, C. D.—Mar. 26, E. N.-R.

★ **Ont., Toronto** — Toronto Stock Exchange, 236 Bay St., constructing 3 story, basement, sub-basement, 97x110 ft., rein.-con., steel, stone office, plain found., Bay St., to Redfern Constr. Co., 614 Excelsior Life Bldg. Est. $500,000. Noted Dec. 18, C. D.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., San Francisco—PLANT—Jas. H. Barry Co., 1122 Mission St., making plans 1 story, rein.-con., 25,000 sq.ft. floor space, printing and publishing plant, Van Ness Ave. S. and 13th St. $40,000. J. Rosenwald, 525 Market St., engr.

Calif., Vernon—FACTORY—Union Die Casting Co., 2269 East 51st St., plans by H. Eckart, 3345 San Gabriel Blvd., San Gabriel, factory. Est. about $37,000 with equipment.

Calif., Woodbridge — WINERY — Del Rio Winery, c/o E. G. Ernst, archt., 9 West Cleveland St., Stockton, plans wood frame, rein.-con. and galvanized iron winery. To exceed $50,000.

Conn., Bridgeport—TERMINAL—Penn-Haven Terminal Co., W. J. Eastman, 28 Fairfield Ave., soon lets contract 2 story, mezzanine, 76x77 ft., brick, steel bus terminal, Water St. $50,000. E. B. Caldwell, 1029 Fairfield Ave., archt. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

Ind., Indianapolis—BREWERY—Indianapolis Brewing Co., Inc. C. Frey, secy., New York and Agnes Sts., making plans constructing 3 story, brewery addition, 946 West New York St. $150,000. E. Morbaach, c/o owner, engr.

Mass., Holyoke—FACTORY—American Writing Paper Co., Inc., 9 Main St., plans repairing flood damaged factory buildings, on Connecticut River, incl. foundations and walls of several buildings. Some new machinery and equipment will be required. Probably exceed $100,000. Private plans.

Mass., Salem—PLANT—Salem Electric Lighting Co., 89 Broad St., Boston, furnishing and driving steel sheet piling at South River plant. F. W. Babb, 89 Broad St., Boston, engr. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Mass., Somerville — WAREHOUSE — H. S. Graves, archt., 137 Newbury St., Boston, soon takes bids from selected list bidders, 1 story, basement, 60x160 ft., concrete block, steel warehouse, incl. heating, plumbing and electrical work, concrete found., Washington St., for owner, c/o architect. Est. about $37,000.

Mass., Worcester—MILL, etc.—Geo. A. Duffy Mfg. Co., 1151 Main St., plans partly rebuilding 4 story, basement, 35x45 ft. mill building and raceway, damaged by flood, Main St. To exceed $37,000. Some new machinery and equipment will be required.

Minn., Minneapolis — WAREHOUSE, etc. — Zephyr Oil Co., W. H. Smith, pres.-treas., 2401 Hiawatha Ave., plans constructing warehouse and compounding plant, service station addition, three 340,000 gal., two 100,000 gal. and fourteen 17,000 gal. steel tanks, pump houses, garage, etc., 2401 Hiawatha Ave. To exceed $35,000 (not official).

Mont., Shelby — POWER PLANT — Great Northern Utilities Co., H. A. Saubert, Great Falls, plans furnishing, installing 1,000 kw. turbo-generator in power plant, additional power house equipment, etc. $100,000.

N. J., Newark—STORAGE WAREHOUSE—P. Ballantine Co., Inc., 57 Freeman St., soon takes bids heating, plumbing and electrical work for new storage warehouse, Freeman St. Total est. $100,000. J. S. Shanley, 33 Washington St., archt. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Buffalo — GARAGE — Terminals & Transportation Co., 275 Fuhrmann St., plans constructing 3 steel automobile ramps, incl. lifting apparatus, 4 loading platforms at company's warehouse and garage, 275 Fuhrmann St. H. E. Plumer & Associates, 775 Main St., engrs.

N. Y., Buffalo—MALTING PLANT—Corporation, c/o Monarch Eng. Co., engrs. and archts., Chamber of Commerce Bldg., soon takes bids 4 story, basement, brick, steel malting plant, plain found., 100 Childs St. Est. about $200,000.

N. Y., Falconer—PLANT—National Worsted Mills, P. O. Box 666, J. G. Ellis, genl. mgr., Jamestown, purchased 3 story, brick plant of Cleveland Worsted Mills, adjoining its textile mill and plans rehabilitating same and installing modern textile machinery and equipment. To exceed $40,000. Private plans.

N. D., Grand Forks—TERMINAL ELEVATOR—Grand Forks Terminal Elevator Co., C. W. Graves, secy., 55 4th Ave. S., plans constructing terminal grain elevator, financing 1st unit of 500,000 bu. capacity. $125,000.

O., Greenville—MILK PLANT—Nestles Milk Products Co., 155 East 44th St., New York, making plans new modern condensing plant, 400,000 lb. capacity near here. $300,000. H. L. Griffin, c/o owner, engr. **Maturity soon.**

O., Hamilton—POWER PLANT—Fosdick & Hilmer, engrs., Union Trust Bldg., soon lets contract constructing 2 water tube boilers, breechings, coal and ash handling equipment, rein.-con. chute, rein.-con. storage silo, feed water heating and softener, power piping, etc., for Beckett Paper Co., $250,000. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

★ **O., Springfield**—PLANT—Crowell Publishing Co. plans installation of new equipment, replacing present equipment, increasing capacity power plant, etc. $1,000,000.

S. C., Sumter—FACTORY—Williams Furniture Co., O. L. Williams, pres., Sumter, plans rebuilding large factory, recently destroyed by fire. $650,000 loss.

Tex., Harlingen—PLANTS—See "Commercial Buildings".

Tex., Houston — WAREHOUSE, etc. — Continental Can Co., c/o R. C. Westerman, mgr., 105 North Greenwood S., plans nearing completion and soon takes bids 3 story, 120x160 ft., rein.-con., brick, warehouse, 40x160 ft., structural steel, metal loading shed. Est. about $250,000. R. J. Cummins, Bankers Mortgage Bldg., engr.

Tex., San Ramon—PACKING PLANT—Port Isabel & Rio Grande Valley Railway, c/o L. C. Hill, Jr., pres., 1301 11th St., Brownsville, plans 2 story, brick, rein.-con., citrus and vegetable packing plant, having icing facilities, loading facilities. Private plans.

Vt., Newport—POWER HOUSE, etc.—Newport Electric Corp. soon lets contract 1 story, basement, 33x50 ft., brick power house and penstock, concrete found., incl. heating, plumbing and electrical work, grading yard and constructing road, furnishing, installing 15 ton crane, c.i. steam boiler, oil burner, oil storage tank, unit heaters, etc. To exceed $37,000 with equipment. Chas. T. Main, Inc., 201 Devonshire St., Boston, Mass., engrs.

Wash., Spokane — FACTORY — Brown Metal Wks., East 404 Sprague St., has option on 2 square blocks on which it plans to build aluminum bus bodies plant.

Wis., Milwaukee — PLANT — International Printing Inks Corp., 522 North Jefferson St., soon takes bids 2 story manufacturing plant, on North Jefferson St. J. Brackett, 50 Church St., New York, and W. H. Kirst Assoc., 2211 Elston Ave., Chicago, Ill., archts. Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

B. C., Hedley—MILL, etc.—Gold Mountain Mine Co., Ltd., W. J. Asselstone, consult. metallurgist, plans gold concentrating mill flotation system and power plant. $40,000.

Ont., St. Catherines — FACTORY — English Electric Co. of Canada Ltd., 660 St. Catherines St. W., Montreal, Que., and George St., St. Catherines, plans factory to manufacture electric light bulbs. $200,000. Engineer and architect not appointed.

★ **Que., Comeau Bay**—PAPER MILL—Ontario Paper Co., Ltd., Quebec, A. A. Schmon, pres., soon takes bids constructing paper mill, also power generating plant and model town at Riviere Outardes. Est. about $1,000,000. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Que., Pointe aux Trembles—COPPER REFINERIES—Canadian Copper Refineries Ltd., purchased 23 lots for extension purposes.

BIDS ASKED

Conn., New Haven—WAREHOUSE—J. Sanford Shanley, archt., 33 Washington St., Newark, N. J., taking bids plumbing, heating and electrical work for 1 story, 62x151 ft., brick, steel beer distributing warehouse, for P. Ballantine & Co., Inc., 57 Freeman St., Newark, N. J. Total est. $40,000. Noted Apr. 8, C. D., under "Contracts Awarded."

Ky., Athertonville—DISTILLERY—See "Contracts Awarded."

Mass., Charlestown—GARAGE—H. P. Hood & Son, Inc., 500 Rutherford Ave., taking bids 1 story, 75x115 ft., brick, structural steel storage garage, concrete found., Roland St. Est. about $37,000. Private plans.

N. Y., Fonda—WAREHOUSE—Owner, c/o H. Daly, archt., 15 East Main St., bids about Apr. 15, constructing brick, steel warehouse, plain found. Est. about $37,000.

Wis., Neillsville—MACHINE SHOP—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles — BUS DEPOT — Pacific Greyhound Lines, 6th and Los Angeles Sts., remodeling bus depot, 6th and Los Angeles Sts., to Atlas Constr. Co., 39 Congress St., Pasadena, approximately $60,000. Noted Apr. 7, C. D.

Calif., Pittsburg—BOTTLING PLANT—Shell Chemical Co., Shell Bldg., San Francisco, steel frame erection and other minor units of work for 65x140 ft., steel truss ammonia bottling plant, to Siino Bros., 710 Black Diamond St., $9,000. Total est. $150,000, incl. equipment. Private plans.

Conn., Bridgeport—PLANT—United Illuminating Co., 84 Temple St., New Haven, general contract 1 story, 62x110 ft., brick, steel, concrete boiler unit at Steel Point Power Station, East Main St., to Mott Constr. Co., 440 Elm St., New Haven. Total est. exceeds $40,000. Noted Mar. 31, C. D.

Ga., Rossville—MILL—Peerless Woolen Mills, alterations and additions to new units, incl. addition to weave mill, altering slasher rooms, to Batson Conklen, West Point. Est. $200,000. Robert & Co., Bona Allen Bldg., Atlanta, archts.

Idaho, Lewiston—WAREHOUSE—Mason-Ehrman & Co., 45 Southeast Ash St., Portland, Ore., general contract rebuilding 1 story, 60x115 ft. heavy mill, brick warehouse, recently destroyed by fire, to G. H. Buckler Co., Lewis Bldg., Portland, Ore. Est. $100,000. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Ky., Athertonville—DISTILLERY—Cummins Distillery Corp., Washington Bldg., Louisville, constructing distillery additions and warehouses, day labor, under supervision of W. C. Wagner, archt., Bresling Bldg. Est. exceeds $40,000.

Mass., Charlestown—BREWERY—Commercial Brewery Co., J. E. Doherty, mgr., 40 Roland St., 4 story, basement, 40x40 ft., brick, steel brewery addition, concrete found., Roland St., to J. Capobianco, 44 School St., Boston. Est. $40,000. E. Hartman, Centre St., North Middleboro, archt.

Mass., Roxbury—MANUFACTURING—W. J. Fallon Leather Co., 34 Norfolk Ave., general contract 3 story, basement, 60x80 ft., brick, steel mill construction, concrete found., Norfolk Ave., to T. O'Connor & Co., Inc., 238 Main St., Cambridge, probably exceeds $40,000. M. A. Reidy, 44 School St., Boston, engr.

Mo., St. Louis—DAIRY—St. Louis Dairy Co., B. M. Lide, Jr., pres., 2000 Pine St., general contract dairy plant additions, between Chestnut, Pine, and 20th and 21st Sts., to Fruin Colnon Contg. Co., 502 Merchants Laclede Bldg., St. Louis. Bids Mar. 31. Noted Mar. 25, C. D.—Mar. 5, E. N.-R.

N. J., Bound Brook—PLANT—Bakelite Corp., 247 Park Ave., New York, constructing plant addition, to N. T. Pedersen & Son, Perth Amboy. Est. $37,000 with equipment. Contractor awarded contract for 100 tons structural steel, to Lehigh Structural Steel Co., Ft. Allen St., Allentown, Pa. Francisco & Jacobus, 511 5th Ave., New York, archts.

N. Y., Buffalo—PLANT—J. W. Cowper Co., general contractors, Rand Bldg., reinforcing steel and sheet steel piling for 6 story, basement, 92x134 ft., factory addition, 817 Washington St., for Trico Products Corp., 817 Washington St., to Bethlehem Steel Corp., Hamburg Turnpike, Lackawanna. Noted Feb. 19, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded".

N. Y., Endicott—GARAGE—F. Valette, 210 Washington St., general contract garage, to Jones & Neorlando, Endicott***plumbing, to L. Picciano, 1204 Witherill St.***heating, to S. P. Ainslee, 43 Laurel St., Johnson City***electrical work, to E. A. Davis, 64 Conklin Ave., Endicott. Est. exceeds $40,000. General contractor awards contract for structural and reinforcing steel, to Binghamton Fdry. & Machine Corp., Floral Ave., Binghamton***reinforcing steel, to Concrete Steel Co., 207 James St., Syracuse.

N. Y., Niagara Falls—PLANT—Niagara Alkali Co., 4205 Buffalo Ave., general contract plant addition, Buffalo Ave., to W. S. Johnson Building Co., 2532 Hyde Park Blvd., est. $50,000; water pumps and equipment for new pump house under construction, to Ingersoll Rand Co., Ellicott Sq. Bldg., Buffalo, est. $1,000. Bids Mar. 25. Noted Mar. 23, C. D.—Feb. 20, E. N.-R.

O., Cincinnati—FACTORY—Cincinnati Milling Machine Co., constructing 1 story, basement, brick, steel factory addition, plain found., to Austin Co., 6112 Euclid Ave., Cleveland, $50,000. Awarded Apr. 1.

O., Columbus — BOILER PLANT — Kroger Grocery & Baking Co., 35 East 7th St., Cincinnati, remodeling present building, erecting two new boilers, 300 hp. motors, to E. Elford & Son, 555 South Front St., about $90,000. Awarded Apr. 1. A. M. Kinney, Carew Tower, Cincinnati, engr.

★ **Pa., Pittsburgh**—STEEL SHEET MILL—Jones & Laughlin Steel Corp., 3rd and Ross Sts., machinery for steel sheet and strip mill, 2nd Ave., to Mesta Machine Co., West Homestead, Pittsburgh; electrical equipment, to General Electric Co., 1 River Rd., Schenectady, N. Y. About $22,000,000. Contract for building will be awarded soon. Total est. $25,000,000.

Tex., Brownsville—COMPRESS—Aransas Compress Co., c/o C. K. Cain, pres., Corpus Christi, 2 story, brick, sheet metal cotton compress plant, plain found. own forces. Est. $200,000. Private plans.

Wash., Hoquiam—FACTORY—Grays Harbor Chair & Mfg. Co., Port Grays Harbor, constructing factory addition, to S. S. Mullen, Hoquiam, $50,000. Awarded Apr. 2.

W. Va., Alloy—PLANT—Union Carbide Co., Niagara Falls, N. Y., and 30 East 42nd St., New York, plant addition, separate contracts awarded; 1,700 tons structural steel and steel erecting, to Lackawanna Steel Constr. Co., Walden Ave., Buffalo. Est. exceeds $250,000. Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

Wis., Neillsville—MACHINE SHOP—E. Brunn & M. Feuerstein, 1 and part basement, 50x60 ft., brick, steel machine shop, plain found., day labor. G. A. Krasin, Marshfield, archt.

Ont., Chatham—PLANT—Libby, McNeill & Libby of Canada Ltd., 330 Richmond St., 2 story, basement, 80x80 ft., rein.-con., steel addition to food manufacturing plant, plain found., Richmond St., to W. H. Yates Constr. Co. Ltd., 17 Main St. E., Hamilton. Est. $50,000. Noted Mar. 17, C. D.

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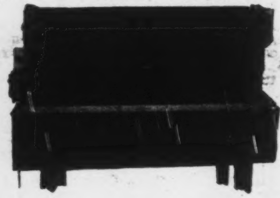

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